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WALTER W. BRADLEY

State Mineralogist

San Francisco]

BULLETIN No. 109

[November, 1933

CALIFORNIA MINERAL PRODUCTION AND DIRECTORY OF MINERAL PRODUCERS FOR 1932



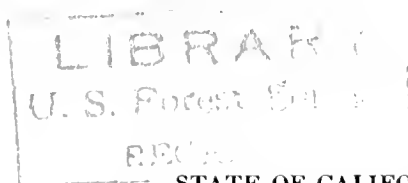
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By
HENRY H. SYMONS

COMPLIMENTS OF
Walter W. Bradley
STATE MINERALOGIST.



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LETTER OF TRANSMITTAL

November, 1933.

*To His Excellency, THE HONORABLE JAMES ROLPH, JR.,
Governor of the State of California.*

SIR: I have the honor to herewith transmit Bulletin No. 109 of the State Division of Mines, being the annual report of the statistics of the mineral production of California.

The remarkable variety, total valuation, and wide distribution of many of our minerals revealed herein show California's importance as a producer of commercial minerals among the states of the Union.

Respectfully submitted.

WALTER W. BRADLEY,
State Mineralogist.

INTRODUCTION

It is the endeavor of the staff of the State Division of Mines (formerly State Mining Bureau), in these annual reports of the mineral industries of California, to so compile the statistics of production that they will be of actual use to producers and to those interested in the utilization of the mineral products of our State, while at the same time keeping the individual's data confidential. In addition to the mere figures of output, we have included descriptions of the uses and characteristics of many of the materials, as well as a brief mention of their occurrences.

The compilation of accurate and dependable figures is an extremely difficult undertaking, and the State Mineralogist takes the opportunity of here expressing his appreciation of the cooperation of the producers in making this work possible. A fuller appreciation of the value of early responses to the requests sent out in January will result in earlier completion of the manuscript. Statistics lose much of their value if their publication is unnecessarily delayed.

Some of the data relative to properties and uses of many of the minerals herein described are repeated from preceding reports, as it is intended that this annual statistical bulletin shall be somewhat of a compendium of information on California's commercial minerals and their utilization.

WALTER W. BRADLEY,
State Mineralogist.

MINERAL INDUSTRY, CALIFORNIA, 1932

DATA COMPILED FROM DIRECT RETURNS FROM PRODUCERS IN ANSWER TO INQUIRIES SENT OUT BY THE CALIFORNIA STATE DIVISION OF MINES, FERRY BUILDING, SAN FRANCISCO, CALIFORNIA

CHAPTER ONE

The total value for the mineral output for California for the year 1932 was \$199,196,493, being a decrease of \$16,767,927 from the total of \$215,964,420 for 1931. There were fifty different mineral substances exclusive of a segregation of the various stones grouped under gems; and all but one of the fifty-eight counties of the State contributed to the list.

As revealed by the data following, the salient features of 1932 compared with the previous year were: Petroleum, gold, mineral water, and talc and soapstone were the major mineral products which showed an increase in the value of output during the year, while declines in values were registered by miscellaneous stone, cement, borax, brick and hollow building tile, soda, and natural gas. Petroleum showed an increase in value of \$1,054,524, although there was a decrease from 188,310,605 barrels to 177,745,286 barrels. Prices received for the lighter gravity oils were higher than in 1931. Natural gas decreased from 344,959,920 M cu. ft. worth \$16,690,695 to 284,168,872 M cu. ft. worth \$16,272,061.

Of the metals the gold yield increased from a total value of \$10,814,162 to \$11,765,626. Decreases in value were registered by all the other metals, copper from 12,954,842 lbs. worth \$1,178,890 to 1,417,536 lbs. worth \$89,307; quicksilver from 13,478 flasks worth \$1,121,624 to 5239 flasks worth \$279,780; silver from 867,818 fine oz. worth \$251,667 to 493,535 fine oz. worth \$139,176; and lead from 3,934,240 lbs. worth \$145,568 to 2,418,626 lbs. worth \$72,480. A small amount of platinum was produced as a by-product from placer gold operations. There was increased activity in both placer and lode gold mining during the year and small scale placer operators, about 12,000 individuals, produced \$493,437 of gold, compared with about \$163,000 for 1931. The prices of the other metals were so low that it did not pay to mine them.

Of the structural materials, bituminous rock was the only one to show an increased output. Decreases were shown by cement from 7,693,712 bbls. worth \$11,510,655 to 5,657,549 bbls. worth \$7,967,107; miscellaneous stone from a total value of \$11,848,531 to \$7,183,643; brick and hollow building tile from a total value of \$2,560,415 to \$1,605,086; and granite from \$636,741 to \$398,676.

Of the industrial materials, the total value decreased from \$4,741,939 to \$3,820,711. Increased values in annual production were shown by mineral water, and talc and soapstone, while all other minerals in this group showed a decreased value. The salines showed a decrease in total value from \$11,779,513 to \$6,135,440 with every material in the group falling off in production.

The figures of the State Division of Mines are made up from reports received direct from the producers of the various minerals. Care is exercised in avoiding duplication, and any error is likely to be on the side of under- rather than over-estimation.

By Substances.

The following table shows the comparative yield of mineral substances of California for 1931 and 1932, as compiled from the returns received at the State Division of Mines, San Francisco, in answer to inquiry sent to producers:

Substance	1931		1932		Increase+ Decrease— Value
	Amount	Value	Amount	Value	
Barytes	27,682 tons	\$156,647	8,507 tons	\$49,409	\$107,238—
Bentonite (fuller's earth)	13,960 tons	222,583	4,295 tons	57,670	164,913—
Borates	206,405 tons	5,753,037	179,356 tons	2,856,470	2,896,567—
Brick and hollow building-tile		2,560,415		1,605,086	955,329—
Cement	7,693,712 bbls.	11,510,655	5,657,549 bbls.	7,967,107	3,543,548—
Chromite	441 tons	6,737	(*)	(*)	(*)—
Clay (pottery)	332,680 tons	408,931	167,284 tons	204,891	204,040—
Coal	12,551 tons	77,607	9,508 tons	36,468	41,139—
Copper	12,954,842 lbs.	1,178,890	1,417,536 lbs.	89,307	1,089,583—
Dolomite	(*)	(*)	35,275 tons	40,956	—
Feldspar	4,795 tons	59,921	2,294 tons	15,988	43,933—
Gems		5,607		4,961	646—
Gold		10,814,162		11,765,726	951,564+
Granite		636,741		398,676	238,065—
Gypsum	88,354 tons	199,198	46,867 tons	93,818	105,380—
Lead	3,934,240 lbs.	145,568	2,418,626 lbs.	72,480	73,088—
Lime	36,189 tons	360,523	27,510 tons	254,223	106,300—
Limestone	177,268 tons	560,699	168,950 tons	487,788	72,911—
Marble ^a		81,760		42,505	39,255—
Mineral water	26,164,331 gals.	1,347,860	19,031,224 gals.	1,495,988	148,128+
Natural gas	344,959,920 M.cu.ft.	16,690,695	284,168,872 M.cu.ft.	16,272,051	418,634—
Petroleum	188,310,605 bbls.	141,835,723	177,745,286 bbls.	142,890,247	1,054,524+
Platinum	350 oz.	11,979	336 oz.	8,142	3,837—
Pumice and volcanic ash	11,711 tons	108,130	9,891 tons	86,034	22,096—
Pyrite	25,402 tons	131,174	(*)	(*)	(*)—
Quicksilver	13,478 flasks	1,121,624	5,349 flasks	279,780	841,844—
Salt	330,951 tons	1,233,567	256,353 tons	918,480	315,087—
Sandstone		30,960		13,286	17,674—
Silica (sand and quartz)	43,330 tons	182,769	33,997 tons	136,324	46,445—
Silver	867,818 fine oz.	251,667	493,535 fine oz.	139,176	112,491—
Soapstone and talc	13,472 tons	109,940	10,690 tons	122,880	12,940+
Soda	78,701 tons	1,217,811	58,017 tons	826,369	391,442—
Stone, miscellaneous ^b		11,848,531		7,183,643	4,664,888—
Unapportioned		5,102,309		2,780,554	2,321,755—
Total values		\$215,964,420		\$199,196,493	
Total decrease					\$16,767,927—

*Included under "Unapportioned."

^a Includes onyx and travertine.

^b Includes macadam, crushed rock, ballast, rubble, rip rap, sand and gravel.

^c Includes bituminous rock, bromine, calcium chloride, diatomite, dolomite, iodine, iron ore, magnesite, magnesium salts, manganese ore, mica, mineral paint, sillimanite-andalusite-cyanite group, potash, slate, tube-mill pebbles, paving blocks, sulphur, tungsten and zinc.

^d Includes asbestos, bituminous rock, bromine, calcium chloride, chromite, diatomite, magnesite, magnesium salts, mica, graphite, potash, pyrite, sillimanite-andalusite-cyanite group, slate, sulphur, tungsten and tube-mill pebbles.

By Counties.

The following table shows the comparative value of the mineral production of the various counties in the State for the years 1931 and 1932:

County	1931	1932
Alameda.....	\$2,417,925	\$1,765,139
Alpine.....	29	1,995
Amador.....	2,170,075	1,400,286
Butte.....	482,737	464,512
Calaveras.....	1,093,554	735,199
Colusa.....	118,905	38,053
Contra Costa.....	1,328,812	1,013,993
Del Norte.....	38,075	25,801
El Dorado.....	437,935	594,902
Fresno.....	2,238,333	3,744,391
Glenn.....	47,462	8,714
Humboldt.....	199,986	117,475
Imperial.....	528,027	251,727
Inyo.....	1,347,708	724,023
Kern.....	28,782,358	28,069,925
Kings.....	17,371,901	22,720,986
Lake.....	280,768	97,084
Lassen.....	1,843	109,568
Los Angeles.....	79,469,897	76,721,115
Madera.....	488,343	298,021
Marin.....	544,760	253,837
Mariposa.....	193,641	379,254
Mendocino.....	72,707	101,669
Merced.....	707,789	749,742
Modoc.....	181,250	51,002
Mono.....	201,923	135,680
Monterey.....	223,470	166,297
Napa.....	396,841	169,633
Nevada.....	3,497,218	3,704,103
Orange.....	15,135,148	14,182,245
Placer.....	285,848	240,248
Plumas.....	1,559,296	181,312
Riverside.....	2,526,503	1,681,855
Sacramento.....	2,259,674	2,339,923
San Benito.....	654,284	199,924
San Bernardino.....	9,975,484	6,043,335
San Diego.....	852,447	375,176
San Francisco.....	20,500	3,903
San Joaquin.....	462,196	270,492
San Luis Obispo.....	400,135	249,930
San Mateo.....	2,230,509	1,343,450
Santa Barbara.....	12,714,760	7,583,197
Santa Clara.....	666,300	321,627
Santa Cruz.....	1,767,134	1,047,766
Shasta.....	666,086	610,986
Sierra.....	691,365	607,872
Siskiyou.....	187,007	184,019
Solano.....	62,270	36,202
Sonoma.....	252,636	167,849
Stanislaus.....	277,281	333,482
Sutter.....		
Tehama.....	50,407	14,387
Trinity.....	328,522	325,275
Tulare.....	197,116	116,074
Tuolumne.....	377,157	300,458
Ventura.....	15,455,727	14,855,606
Yolo.....	21,500	21,625
Yuba.....	1,022,826	989,149
Totals.....	\$215,964,420	\$199,196,493

Total Mineral Production of California, by Years, Since 1887.

The following tabulation gives the total value of mineral production of California by years since 1887, in which year compilation of such data by the State Mining Bureau (now Division of Mines) began. At the side of these figures have been placed the values of the most important metal and non-metal items—gold and petroleum.

In the same period copper made an important growth beginning with 1897 following the entry of the Shasta County mines, and more recently Plumas County. Cement increased rapidly from 1902, while crushed rock, sand and gravel as a group parallels the cement increase. Quicksilver has been up and down. Mineral water and salt have always been important items, but the values fluctuate. Borax has increased materially since 1896. War-time increases, 1915–1918, were shown by chromite, copper, lead, magnesite, manganese, silver, tungsten and zinc. Most of these have since declined, though silver, structural materials and copper increased in 1920–1924, also lead and magnesite in 1923; lead and zinc in 1925; zinc in 1926, with silver declining; an increase in quicksilver in 1927–1928, with declines in other metals and by petroleum. Natural gas has shown a steady increase since 1907, and since 1928 its value has been second only to petroleum.

Total Mineral Production of California, by Years, Since 1887

Year	Total value of all minerals	Gold, value	Petroleum, value
1887.....	\$19,785,868	\$13,588,614	\$1,357,144
1888.....	19,469,320	12,750,000	1,380,666
1889.....	16,681,731	11,212,913	368,048
1890.....	18,039,666	12,309,793	384,200
1891.....	18,872,413	12,728,869	401,264
1892.....	18,300,168	12,571,900	561,333
1893.....	18,811,261	12,422,811	608,092
1894.....	20,203,294	13,923,281	1,064,521
1895.....	22,844,663	15,334,317	1,000,235
1896.....	24,291,398	17,181,562	1,180,793
1897.....	25,142,441	15,871,401	1,918,269
1898.....	27,289,079	15,906,478	2,376,420
1899.....	29,313,460	15,336,031	2,660,793
1900.....	32,622,945	15,863,355	4,152,928
1901.....	34,355,981	16,989,044	2,961,102
1902.....	35,069,105	16,910,320	4,692,189
1903.....	37,759,040	16,471,264	7,313,271
1904.....	43,778,348	19,109,600	8,317,809
1905.....	43,069,227	19,197,043	9,007,820
1906.....	46,776,085	18,732,452	9,238,020
1907.....	55,697,949	16,727,928	16,783,943
1908.....	66,363,198	18,761,559	26,566,181
1909.....	82,972,209	20,237,870	32,398,187
1910.....	88,419,079	19,715,440	37,683,542
1911.....	87,497,879	19,738,908	40,552,088
1912.....	88,972,385	19,713,478	41,868,344
1913.....	98,644,639	20,406,958	48,578,014
1914.....	93,314,773	20,653,496	47,487,109
1915.....	96,663,369	22,442,296	43,503,837
1916.....	127,901,610	21,410,741	57,421,334
1917.....	161,202,962	20,087,504	86,976,209
1918.....	199,753,837	16,529,162	127,459,221
1919.....	195,830,002	16,695,955	142,610,563
1920.....	242,099,667	14,311,043	178,394,937
1921.....	268,157,472	15,704,822	203,138,225
1922.....	245,183,826	14,670,346	173,381,265
1923.....	344,024,678	13,379,013	242,731,309
1924.....	374,620,789	13,150,175	274,652,874
1925.....	434,519,660	13,065,330	330,609,829
1926.....	450,330,856	11,923,481	345,546,677
1927.....	366,781,394	11,671,018	260,735,498
1928.....	332,224,233	10,785,315	229,998,680
1929.....	432,248,228	8,526,703	321,366,863
1930.....	365,604,695	9,451,162	271,699,046
1931.....	215,964,420	10,814,162	141,835,723
1932.....	199,196,493	11,765,726	142,890,247
Totals.....	\$6,267,265,795	\$716,749,639	\$3,927,820,662

CHAPTER TWO

FUELS

Among the most important mineral products of California are its fuels. This subdivision includes coal, natural gas, and petroleum, the combined values of which made up practically 83 per cent of the State's entire mineral output for the year 1932.

There are deposits of peat known in several localities in California, small amounts of which are used as a fertilizer, and in stock-food preparations, but none has yet been recorded as utilized for fuel.

Comparison of values during 1931 and 1932 is shown in the following table:

Substance	1931		1932		Increase + Decrease— Value
	Amount	Value	Amount	Value	
Coal.....	12,551 tons	\$77,607	9,508 tons	\$36,468	\$41,139—
Natural gas.....	344,959,920 M.cu.ft.	16,690,695	284,168,872 M.cu.ft.	16,272,061	418,634—
Petroleum.....	188,310,605 bbls.	141,835,723	177,745,286 bbls.	142,890,247	1,054,524+
Total values.....		\$158,604,025		\$159,198,776	
Net increase.....					\$594,751+

COAL

Bibliography: State Mineralogist Reports VII, XII–XV (inc.), XVII, XIX–XXVIII (inc.), XXVI. U. S. Geol. Surv., Bulletins 285, 316, 431, 471, 581; Ann. Rept. 22, Pc. III.

Coal produced in California during 1932 totaled 9508 short tons valued at \$36,468, as compared with the 1931 output, which was 12,551 tons worth \$77,607. The material mined in 1932 came from a single property in each, Amador, Monterey, and Trinity counties. This coal was consumed by the local market and also used on the property for camp purposes, power and forge, to carry on regular operations and development work.

Total Coal Production of California.

The very considerable output of coal in the years previous to 1883 was almost entirely from the Mount Diablo district, Contra Costa County. Later the Tesla mine in Corral Hollow, Alameda County, was an important producer for a few years. Stone Canyon, Monterey County, was also an important producer for a short time, and there has been some coal shipped from properties in Amador, Fresno, Orange, Riverside, Siskiyou and Trinity counties. The following tabulation gives the annual tonnages and values, according to available records:

Coal Output and Value, by Years

Year	Tons	Value	Year	Tons	Value
1861	6,620	\$38,065	1898	143,045	\$337,475
1862	23,400	134,550	1899	160,941	420,109
1863	43,200	248,400	1900	176,956	535,531
1864	50,700	291,525	1901	150,724	401,772
1865	60,530	348,048	1902	88,460	248,622
1866	84,020	483,115	1903	93,026	265,383
1867	124,690	716,968	1904	79,062	376,494
1868	143,676	826,137	1905	46,500	144,500
1869	157,234	904,096	1906	24,850	61,600
1870	141,890	815,868	1907	23,734	55,849
1871	152,493	876,835	1908	18,496	55,503
1872	190,859	1,097,439	1909	49,389	216,913
1873	186,611	1,073,013	1910	11,033	23,484
1874	215,352	1,238,274	1911	11,047	18,297
1875	166,638	958,169	1912	14,484	39,092
1876	128,049	736,282	1913	25,198	85,809
1877	107,789	619,787	1914	11,859	28,806
1878	134,237	771,863	1915	10,299	26,662
1879	147,879	850,304	1916	4,037	7,030
1880	236,950	1,362,463	1917	3,527	7,691
1881	140,000	805,000	1918	6,343	16,149
1882	112,592	647,404	1919	2,983	8,203
1883	76,162	380,810	1920	2,078	5,450
1884	77,485	309,950	1921	12,467	63,578
1885	71,615	286,460	1922	27,020	135,100
1886	100,000	300,000	1923	1,010	5,090
1887	50,000	150,000	1924	1,425	8,800
1888	95,000	380,000	1925	730	3,880
1889	121,280	288,232	1926	1,100	5,000
1890	110,711	283,019	1927	200	1,100
1891	93,301	204,902	1928	782	4,542
1892	85,178	209,711	1929	450	2,476
1893	72,603	167,555	1930	10,885	59,858
1894	59,887	139,862	1931	12,551	77,607
1895	79,858	193,790	1932	9,508	36,468
1896	70,649	161,335			
1897	87,449	196,255	Totals	5,242,786	\$23,285,409

The tonnages in the above table for the years 1861-1886 (incl.) are taken from the U. S. Geological Survey, "Mineral Resources of the U. S., 1910," p. 107. The values assigned for the years previous to 1883 are those given by W. A. Goodyear (Mineral Res., 1882, pp. 93-94), being an average of \$5.75 per ton. From 1887 to date the figures are those of the California State Mining Bureau.

NATURAL GAS

Bibliography: State Mineralogist Reports VII, X, XII, XIII, XIV. Bulletins 3, 16, 19, 69, 73, 89. Monthly Summary, Oil & Gas Supervisor, Dec., 1919; Aug., 1922; Mar., 1923; Mar. and Apr., 1926.

Statistics on the production of natural gas in California are in a considerable degree difficult to arrive at, as much of it that is utilized directly at the wells for heating, lighting, and driving gas engines is not measured. Hence, it is necessary to approximate the output of many of the operators in the oil fields, estimated on the number of lights, and on the number and horsepower of gas engines and steam boilers thus operated. The figures here given are for gas utilized locally and also that sold for distribution to consumers; and we consider are not over-estimated, particularly in the six oil-producing counties. It must be remembered that some of our important oil fields are removed many miles from the site of any other industry, and that the gathering of small amounts of gas and transporting it for any considerable distance

may not always be profitable, nor is it often possible to have pipe-line facilities available to handle the gas accompanying the early gas production in newly developed fields. Wherever feasible, casing-head gas is used in driving gas engines for pumping and drilling, and in firing the boilers of steam-driven plants.

Actual Production of Natural Gas—How Disposed of in California

<i>County</i>	<i>M cu. ft. produced</i>	<i>M cu. ft. utilized</i>	<i>M cu. ft. wasted</i>	<i>M cu. ft. stored</i>
Fresno -----	25,476,992	25,476,752	240	-----
Kern -----	36,160,497	26,234,262	1,739,045	8,187,190
Kings -----	99,080,377	92,279,724	6,799,623	1,030
Los Angeles -----	87,642,922	83,699,705	1,977,593	1,965,694
Orange -----	12,442,379	11,374,502	661,377	406,430
Santa Barbara -----	7,173,511	4,479,831	1,673,785	1,019,895
Ventura -----	45,744,791	40,432,752	4,650,095	661,944
Other counties -----	191,344	191,344	-----	-----
Totals -----	313,912,813	284,168,872	17,501,758	12,242,183

Production and Value.

There is rather a wide variation in prices quoted for natural gas because a considerable part is used directly in the field for driving gas engines and firing boilers, and is therefore not measured nor sold. Such companies as have placed a valuation on the gas that was thus used in 1932 gave from 2¢ to 36¢ per 1000 cu. ft. at the well. From the totals shown in the tabulation following herein, the average value for all fields in 1932 works out at approximately 5.7¢ per M cu. ft. Approximately 7000 cu. ft. of gas is equal to one barrel of oil in heating value, and is so accounted for by many operators. In driving gas engines, about 4000 cu. ft. per 24 hr. are consumed by a 25-h.p. engine, and 63,700 cu. ft. per day for heating a 70-h.p. steam boiler, which figures have been utilized in compiling this report, in those cases where gas was not metered.

Production of Natural Gas in California, 1932

<i>County</i>	<i>M cu. ft.</i>	<i>Value</i>
Fresno -----	25,476,752	\$1,520,285
Kern -----	26,234,262	1,201,293
Kings -----	92,279,724	4,322,190
Los Angeles -----	83,699,705	5,379,497
Orange -----	11,374,502	1,095,752
Santa Barbara -----	4,479,831	309,154
Ventura -----	40,432,752	2,393,920
Butte, Humboldt, Lake, Mendocino, Monterey, Sacramento, San Joaquin, San Mateo *-----	191,344	49,970
Totals -----	284,168,872	\$16,272,061

* Combined to conceal the output of a single operator in each.

The above totals were a decrease in both quantity and value from those of 1931 output which was 344,959,920 M cu. ft. valued at \$16,690,-695. As in the past, the Los Angeles County production had the largest value, although Kings County led in quantity. Fresno County showed an increase in both output and value, while all other counties registered declined production, although Ventura has an increase in value.

Natural Gas Production in California Since 1888.

The production of natural gas in California by years since 1888 is given in the following table. The first economic use of natural gas in

California was from the famous courthouse well at Stockton, bored in 1854-1858. Beginning about 1883 and for several succeeding years, a number of gas wells were brought in around Stockton, and later at Sacramento. Natural gas was known in a number of other localities, and occasionally utilized in a small way, notably at Kelseyville in Lake County, and in Humboldt County near Petrolia and Eureka, but there are no available authentic records of amounts or values previous to the year 1888. The most important developments in the commercial production of natural gas have been coincident with developments in the oil fields, by utilizing the casing-head gas as well as that from dry-gas wells.

Natural Gas Production in California Since 1888

Year	M cubic feet	Value	Year	M cubic feet	Value
1888.....	^a 12,000	\$10,000	1912.....	^a 12,600,000	\$ 940,076
1889.....	^a 14,500	12,680	1913.....	14,210,836	1,053,292
1890.....	^a 41,250	33,000	1914.....	16,529,963	1,049,470
1891.....	^a 39,000	30,000	1915.....	21,992,892	1,706,480
1892.....	^a 75,000	55,000	1916.....	28,134,365	2,871,751
1893.....	^a 84,000	68,500	1917.....	44,343,020	2,964,922
1894.....	^{a,b} 85,080	79,072	1918.....	46,373,052	3,289,524
1895.....	^{a,b} 110,800	112,000	1919.....	52,173,503	4,041,217
1896.....	^{a,b} 131,100	111,457	1920.....	58,567,772	3,898,286
1897.....	^a 71,300	62,657	1921.....	67,043,797	4,704,678
1898.....	^a 111,165	74,424	1922.....	103,628,027	6,990,030
1899.....	115,110	95,000	1923.....	240,405,397	15,661,433
1900.....	40,566	34,578	1924.....	209,021,596	15,153,140
1901.....	120,800	92,034	1925.....	194,719,924	15,890,082
1902.....	120,968	99,443	1926.....	214,549,477	19,465,347
1903.....	120,134	75,237	1927.....	224,686,940	20,447,294
1904.....	144,437	91,035	1928.....	260,887,116	22,260,947
1905.....	148,345	102,479	1929.....	400,129,201	29,675,546
1906.....	168,175	109,489	1930.....	315,513,952	24,559,840
1907.....	169,991	114,759	1931.....	344,959,920	16,690,695
1908.....	842,883	474,584	1932.....	284,168,872	16,272,061
1909.....	1,148,467	616,932	Totals.....	3,175,034,626	\$234,308,717
1910.....	10,579,933	1,676,367			
1911.....	^a 5,000,000	491,859			

^a Quantity, in part, estimated, where values only were reported.

^b Includes natural CO₂ from a mine in Santa Clara County.

Gasoline from Natural Gas.

More or less gas usually accompanies the petroleum in the oil fields, and such gas carries varying amounts of gasoline. A total of 135 plants were in operation in 1931 recovering gasoline by compression or absorption from this 'casing-head' gas. After the gasoline is extracted the remaining 'dry gas' so far as practicable is taken into pipe lines, by which it is distributed to consumers, both domestic and commercial.

A total of 544,698,691 gallons of casing-head gasoline valued at \$23,630,291 was reported made from all fields in California by plants during 1932, compared with 676,940,479 gallons worth \$31,254,688 from 135 plants in 1931. It was distributed as follows:

County	No. plants	Gallons	Value
Fresno	2	4,246,761	\$140,953
Kern	18	41,858,941	2,134,560
Kings	6	136,156,263	6,942,077
Los Angeles	52	264,323,154	10,356,676
Orange	16	31,221,665	1,310,106
Santa Barbara	5	19,292,769	913,358
Ventura	11	47,591,838	1,831,759
Others	1	7,300	802
Totals	111	544,698,691	\$23,630,291

The usual recoveries of gasoline from natural gas vary from $\frac{1}{2}$ gal. to 3 gal. per 1000 cu. ft. of gas handled, the average being about 1 gal. per 1000 cu. ft. The U. S. Bureau of Mines Reports by Knudsen ¹ gives the average recovery for 1932 as 1574 gallons per 1000 cu. ft. of gas treated. His figures show the following production by methods:

	<i>M cu. ft. natural gas treated</i>	<i>Gallons gaso- line recovered</i>	<i>Recovery, gal. per M cu. ft.</i>
Oil absorption -----	344,239,570	542,915,957	1.577
Compression -----	1,981,224	2,116,093	1.068
Totals -----	346,220,794	545,032,050	1.574

PETROLEUM

Bibliography: State Mineralogist Reports IV, VII, X, XII, XIII. Bulletins 3, 11, 16, 19, 31, 32, 63, 69, 73, 82, 84, 89. Reports of Oil and Gas Supervisor 1915 to date (issued in monthly chapters since April, 1919, to June, 1929, and quarterly from then on). U. S. Geol. Surv. Bulletins 213, 285, 309, 317, 321, 322, 340, 357, 398, 406, 431, 471, 541, 581, 603, 621, 623, 653, 691. Prof. Papers 116, 117. "American Petroleum; Supply and Demand"; Amer. Petr. Inst., 1925.

The crude petroleum produced in California during 1932 amounted to a total of 177,745,286 barrels, having a value of \$142,890,247 at the well; this was a decrease in quantity with an increased value as compared with the 1931 output, which was 188,310,605 barrels worth \$141,835,723.

This total of quantity is compiled from the monthly production reports filed by the operators with the State Oil and Gas Supervisor.

The question of the value of the crude oil yield at the well is a difficult one to settle with exactitude principally because a large part of the output is not sold until after refining. The large refiners are also large producers of crude oil which they send direct from well to plant, hence much of the crude oil is not sold as such.

The value used in the statistical reports of the State Mining Bureau and the Division of Mines and Mining from 1914 to 1927 (inc.) was derived from an average of actual sales of crude oil of all grades in each field of the State and their average applied to the total yield of each respective field. The 1929-1932 values, used by the Division of Mines, were obtained by using the production of crude oil by gravities produced in each field ² and applying an average of current price quotations for crude oil at the well as compiled by California Oil and Gas Association.

¹ Knudsen, E. T., The Petroleum situation in the Pacific Coast territory (Monthly for 1932), U. S. Bureau of Mines.

² By courtesy of Standard Oil Co. of California.

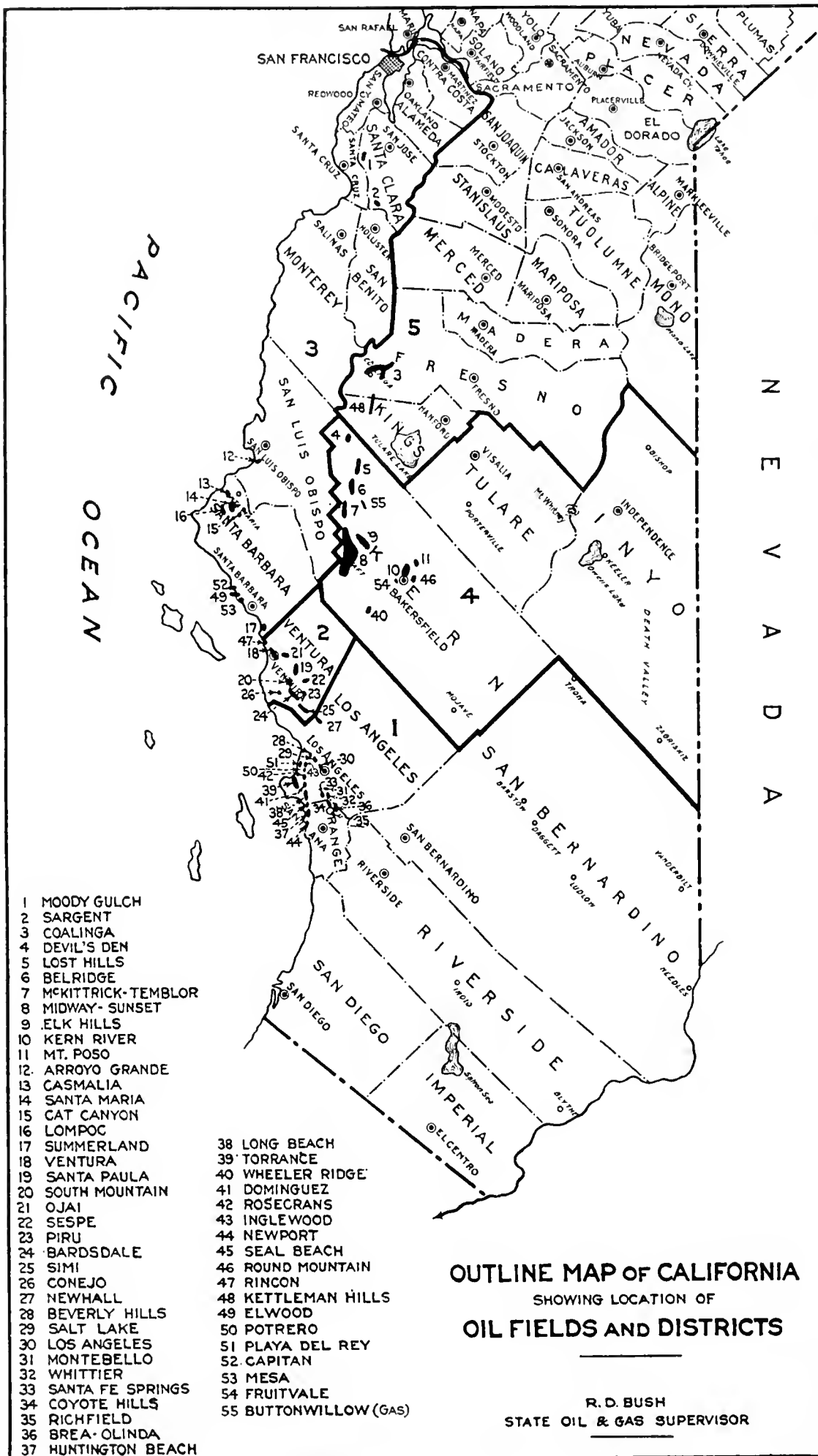


TABLE A
Production and Value of Crude Oil by Counties

<i>County</i>	<i>1931</i>		<i>1932</i>	
	<i>Barrels</i>	<i>Value</i>	<i>Barrels</i>	<i>Value</i>
Fresno -----	2,991,976	\$1,649,476	3,665,641	\$2,038,096
Kern -----	35,794,138	22,765,072	35,552,561	23,393,585
Kings -----	17,607,527	12,735,524	21,981,835	18,398,796
Los Angeles -----	85,382,013	66,999,266	78,361,176	67,390,611
Orange -----	17,564,062	13,231,012	16,981,368	12,939,802
San Bernardino -----			2,472	1,884
San Luis Obispo -----	*	*	66,744	36,709
Santa Barbara -----	11,660,456	11,121,743	6,658,649	6,405,620
Santa Clara -----	*	*	12,954	7,125
Tulare -----	*	*	410	226
Ventura -----	17,245,113	13,297,707	14,461,476	12,277,793
San Luis Obispo, Santa Clara, Tulare *	65,315	35,923		
Totals -----	188,310,605	\$141,835,723	177,745,286	\$142,890,247

* Combined to conceal the output of a single operator in each.

The foregoing totals show the average price of \$0.807 per barrel for the year 1932, as compared with \$0.753 in the year 1931, \$1.195 in 1930, \$1.094 in 1929, \$0.992 in 1928, \$1.127 in 1927.

TABLE B
Average Price of Oil Per Barrel, by Counties 1923-1932

<i>County</i>	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932
Fresno.....	\$1.710	\$1.162	\$1.094	\$0.815	\$0.830	\$0.764	\$0.519	\$0.568	\$0.551	\$0.556
Kern.....	.819	1.137	1.432	1.445	1.139	.835	.741	.838	.636	.658
Kings.....							1.674	1.515	.723	.837
Los Angeles.....	.971	1.239	1.429	1.645	1.115	1.051	1.189	1.297	.784	.860
Orange.....	.880	1.183	1.417	1.559	1.207	.935	.986	1.060	.753	.762
San Luis Obispo.....	.600	.992	1.087							.550
Santa Barbara.....	.782	1.036	.914	.793	.750	1.108	1.255	1.404	.954	.962
Santa Clara.....	1.404	1.921	1.634							.550
Ventura.....	1.138	1.334	1.710	1.512	1.177	1.098	1.150	1.396	.771	.849
State averages...	\$0.923	\$1.200	\$1.422	\$1.538	\$1.127	\$0.992	\$1.094	\$1.195	\$0.753	\$0.807

For several years previous to 1919, the State average value per barrel at the well for crude oil as determined by the statistical returns was noted to practically coincide with the quotations during the same years for 23° gravity oil in the San Joaquin Valley fields. In 1919 and since, the average values have worked out at figures corresponding to quotations up to, in one year as high as 28° oil, due to the large yield of high-gravity oils from the new fields in the Los Angeles-Orange counties area.

Features of 1932.

Summary of data for the year, as given by the State Oil and Gas Supervisor,¹ is indicated as follows:

“Production.

“The total production in the State for the last six months of 1932 was 87,210,711 barrels of oil and 55,883,682 barrels of water. The production of oil for the year 1932 was, therefore, 177,745,286 barrels, a decrease of 10,525,319 barrels compared with that of 1931.

“The production of oil for the second half of 1932 was 3,323,864 barrels less than for the first half. Water production increased 1,387,736 barrels during the same period. * * *

¹ Bush, R. D., Resume of the Oil Field Operations in 1932, Summary of Operations—California Oil Fields, Vol. 18, No. 3, January, February, and March, 1932.

"These data are compiled by the field offices of the Division of Oil and Gas from the monthly production reports, giving the individual well productions, filed with the State Oil and Gas Supervisor by all producing companies.

"The estimated closed-in production was increased in 1932 from 277,376 barrels daily in January to a maximum of 294,407 barrels in July, and then decreased to 256,825 barrels in December. * * *

"Storage and Price Changes.

"The total crude and refined petroleum in storage in Pacific Coast territory at the end of 1932 was 168,246,425 barrels according to the American Petroleum Institute. The decrease in storage during the year was 1,589,524 barrels, compared with a decrease of 10,360,444 barrels during 1931. The total amount of crude and refined oil shipped to eastern ports during 1932 was 11,823,000 barrels, or 6,013,000 barrels less than 1931 shipments. In June, 1932, prices of 20 gravity oil and lighter were increased, the amounts ranging from 4 cents per barrel to 36 cents per barrel for the lightest oils.

"Drilling and Development.

"During 1932, 279 wells were reported to the State Oil and Gas Supervisor as ready to drill as compared with 329 new wells in 1931. No new fields were discovered in 1932, and the only development of importance was the discovery of a new deep zone in the North Belridge field."

TOTAL PETROLEUM PRODUCTION OF CALIFORNIA

The presence of oil seepages and springs in Los Angeles and Ventura counties was known and utilized in a small way early in the history of California. Some also was shipped to refineries at San Francisco from Santa Barbara and Humboldt counties. In the light of present-day developments, the following reference to the previous year's production of oil and its future prospects as expressed by the San Francisco Bulletin of January 8, 1866, is strikingly prophetic even though skeptical:

"It is possible that the small quantity received (40,000 or 50,000 gallons in 1865) may be the forerunner of many millions which will, at some future time, lubricate the wheels of commerce and set a trade at work excelling in variety any that has thus far been known on this coast. At present, however, we admit to being a little skeptical about the assumption of the astute Professor Silliman that California will be found to have more oil in its soil than all the whales in the Pacific Ocean."

According to Hanks,¹ in 1874 production amounted to 36 bbl. per day from natural flows in Pico Cañon (Newhall), and at Sulphur Mountain (Ventura County), the oil being of 32° gravity average.

"Work was commenced in Pico Canyon in 1875 by drilling three shallow wells with spring pole, all of which yielded oil at depths of from 90 to 250 feet. Actual work of development commenced with steam machinery in 1877."²

In 1877 Pico averaged 40-50 bbl. daily, and Ventura 80 bbl. daily. In 1878, there was some production (at 60 bbl. per day, for a time) from wells in Moody Gulch, near Los Gatos, Santa Clara County, the oil being of 46° Baumé.

The first wells in the Coalinga, Fresno County, and Summerland, Santa Barbara County, fields were drilled in 1890, but Coalinga did not make its influence felt conspicuously on the state's annual output until 1903. The Summerland yield never has been large. The Salt Lake field near Los Angeles began production in 1894 and in 1897 reached over a million barrels annually.

In the Kern County fields, the first well was drilled in Sunset in 1891, Midway in 1900, McKittrick in 1892, Kern River in 1899. The Sunset-Midway district attained a yield of over 4,000,000 bbl. in 1909, and over 20,000,000 bbl. in 1910. Kern River field produced over 3,000,000 bbl. in 1901.

The first well in the Santa Maria-Lompoc group, Santa Barbara County, was drilled in 1901, and the district advanced to a yield of over 3,000,000 bbl. annually in 1905.

¹ Hanks, Henry G., Report IV of State Mineralogist, p. 298, 1884.

² *Idem*, p. 301.

The Whittier-Fullerton field in Los Angeles and Orange counties became an important factor in 1902. The Montebello field, Los Angeles County, was the conspicuous addition in 1918-1919; and Elk Hills, Kern County, with Huntington Beach and Richfield, Orange County, in 1920. In 1921, the new fields added were Long Beach and Santa Fe Springs, Los Angeles County; in 1922, Torrance field in Los Angeles County, and Wheeler Ridge field in Kern County; but the production from the large number of new wells started in these new Los Angeles County fields did not reach its peak until August and September, 1923. Dominguez (Compton) came in during 1923; followed by Rosecrans and Inglewood in 1924. Ventura recorded important additions to its producing area in 1925 and 1926. Seal Beach, Orange County, and Mt. Poso, Kern County, were the new fields added in 1926; Round Mountain, Kern County, and Rincon, Ventura County, were the new fields added in 1927; with Potrero in Los Angeles County, Elwood in Santa Barbara County and Kettleman Hills in Kings County in 1928.

During 1929 Playa Del Rey was added to the oil fields in Los Angeles County.

The effect of the advent of these various fields to the producing column will be noted in the tabulation herewith, by years:

TABLE C
Total Petroleum Production In California

Year	Barrels	Value	Year	Barrels	Value
To and inc. 1875	• 175,000	^b \$472,500	1905	34,275,701	\$9,007,820
1876	12,000	30,000	1906	32,624,000	9,238,020
1877	13,000	29,250	1907	40,311,171	16,783,943
1878	15,227	30,454	1908	48,306,910	26,566,181
1879	19,858	39,716	1909	58,191,723	32,398,187
1880	40,552	60,828	1910	77,697,568	37,689,542
1881	99,862	124,828	1911	84,648,157	40,552,088
1882	128,636	257,272	1912	89,689,250	41,868,344
1883	142,857	285,714	1913	98,494,532	48,578,014
1884	262,000	655,000	1914	102,881,907	47,487,109
1885	325,000	750,750	1915	91,146,620	43,503,837
1886	^a 377,145	^b 870,205	1916	90,262,557	57,421,334
1887	678,572	1,357,144	1917	95,396,309	86,976,209
1888	690,333	1,380,666	1918	99,731,177	127,459,221
1889	303,220	368,048	1919	101,182,962	142,610,563
1890	307,360	384,200	1920	103,377,361	178,394,937
1891	323,600	401,264	1921	112,599,860	203,138,225
1892	385,049	561,333	1922	138,468,222	173,381,265
1893	470,179	608,092	1923	262,875,690	242,731,309
1894	783,078	1,064,521	1924	228,933,471	274,652,874
1895	1,245,339	1,000,235	1925	232,492,147	330,609,829
1896	1,257,780	1,180,793	1926	224,673,281	345,546,677
1897	1,911,569	1,918,269	1927	231,195,774	260,735,498
1898	2,249,088	2,376,420	1928	231,811,465	229,998,680
1899	2,677,875	2,660,793	1929	292,534,221	321,366,863
1900	4,319,950	4,152,928	1930	227,328,988	271,699,046
1901	7,710,315	2,961,102	1931	188,310,605	141,835,723
1902	14,356,910	4,692,189	1932	177,745,286	142,890,247
1903	24,340,839	7,313,271			
1904	29,736,003	8,317,809	Totals	3,892,545,111	\$3,931,427,179

^a U. S. G. S., Min. Res. of U. S., 1886, p. 440, for quantities to and including 1886.

^b Values have been estimated for the years to and including 1886, after consulting a number of contemporaneous publications, including the Mining & Scientific Press, Reports of the State Mineralogist, and U. S. Reports. The figures for 1887 to date are from records of the State Mining Bureau.

Well Data.

The following table is compiled from monthly statements issued by the American Petroleum Institute:

TABLE D
Wells Operated, by Fields. 1932

Field	Wells producing Dec. 1931	Wells producing Dec. 1932	Wells com- pleted during year	Daily initial output	Wells aban- doned during year	Bbbl. per well produced per day Dec. 1931	Bbbl. per well produced per day Dec. 1932
GROUP No. 1—Coalinga.....	621	663	1	10	5	11.9	16.1
Elk Hills.....	205	195	—	—	2	62.0	61.3
Fruitvale.....	20	51	32	13,071	3	161.1	99.4
Kern River.....	906	913	3	350	3	10.7	9.4
Kettleman N. D.....	24	34	14	78,181	5	2,487.9	1,750.8
Kettleman M. D.....	—	—	1	1,245	1	—	—
Lost Hills-Belridge.....	159	159	4	10,358	0	58.0	61.4
McKittrick.....	121	113	1	80	1	14.7	14.5
Midway-Sunset.....	1,711	1,740	5	681	18	29.2	28.1
Mount Poso.....	73	90	4	633	2	114.9	83.4
Round Mountain.....	7	19	9	2,393	1	215.9	116.3
Wheeler Ridge.....	33	34	—	—	0	15.8	14.4
GROUP No. 2—Capitan.....	—	—	1	25	0	—	0
Elwood.....	49	35	4	2,513	0	400.7	381.3
Rincon.....	33	33	1	250	0	48.6	62.5
San Miguelito.....	2	2	—	—	0	255.5	514.0
Santa Barbara.....	5	8	6	1,434	0	35.8	86.3
Santa Maria.....	166	170	2	297	2	15.3	17.1
Summerland.....	62	64	—	—	0	2.0	2.5
Ventura Avenue.....	138	154	9	11,853	2	294.6	243.7
Ventura-Newhall.....	410	425	4	184	19	9.4	6.8
Watsonville.....	6	6	—	—	0	10.2	10.3
GROUP No. 3—Coyote.....	159	87	7	6,584	15	63.7	115.6
Dominguez.....	50	44	8	12,866	0	257.6	416.3
Fullerton (Brea- Olinda).....	356	355	2	175	0	26.6	22.3
Huntington Beach.....	324	383	1	100	20	68.8	62.1
Inglewood.....	210	219	3	435	0	65.3	56.2
Lawndale.....	7	6	—	—	0	43.4	52.7
Long Beach.....	884	945	29	5,031	51	86.3	74.4
Los Angeles- Salt Lake.....	259	224	—	—	43	4.3	4.4
Montebello.....	167	154	—	—	7	38.8	31.9
Newport.....	1	—	—	—	1	16.0	—
Playa Del Rey.....	174	199	6	2,440	19	122.9	67.0
Potrero.....	10	12	1	975	4	110.1	50.2
Richfield.....	148	156	1	105	3	44.6	37.5
Rosecrans.....	63	65	—	—	8	50.1	46.3
Santa Fe Springs.....	421	516	1	65	17	151.0	108.2
Seal Beach.....	108	105	4	4,384	7	121.8	104.3
Torrance.....	346	375	3	105	6	17.5	15.9
Whittier.....	171	140	—	—	0	6.1	7.6
GROUP No. 4—Buttonwillow Gas Field.....	1	2	15	(Gas)	3	(Gas)	(Gas)
Dudley Ridge Gas.....	—	—	1	(Gas)	—	(Gas)	(Gas)
Goleta Gas Field.....	2	—	1	(Gas)	5	(Gas)	(Gas)
Miscellaneous drilling.....	—	—	—	—	90	—	—
Totals.....	8,612	8,911	184	156,823	363	58.3	52.9

Specific Gravity of Oils Produced.

The proportion of heavy and light oil produced in the various fields is shown in Table E, following, for which we are indebted to the Standard Oil Company. Specific gravities in California range from 8° Baumé in the Casmalia field, Santa Barbara County, to 56° Baumé in Ventura County and 60° in Kettleman Hills, Kings County.

California crude oils are all essentially of asphalt base, with a few notable exceptions. In the following localities are wells yielding crudes containing both asphalt and paraffine constituents: Oil City field, Coalinga; a few deep wells in East Side field, Coalinga; a considerable part of the Ventura County fields; Western Minerals area, south of Maricopa; Wheeler Ridge, Kern County.

TABLE E
Production of Light and Heavy Oils, by Fields, for 1932

Field	Under 20° (barrels)*	20° above (barrels)*	Total (barrels)*
Kern River.....	3,395,129		3,395,129
Round Mountain.....	932,149	3,803	935,952
Mount Poso.....	2,905,793		2,905,793
Fruitvale.....	115,920	1,487,406	1,603,326
Edison.....	1,120		1,120
Terra Bella.....	800		800
Lost Hill-Belridge.....	99,870	3,258,843	3,358,713
McKittrick.....	650,996		650,996
Elk Hills.....	1,410,554	3,128,870	4,539,424
Midway-Sunset.....	6,126,028	11,943,006	18,069,034
Wheeler Ridge.....	29,946	157,054	187,000
Coalinga.....	2,564,135	1,098,647	3,662,708
Kettleman Hills.....		21,925,417	21,925,417
Watsonville.....	23,790		23,790
Arroyo Grande.....	52,763		52,763
Lompoc.....		8,578	8,578
Santa Maria.....	262,223	755,014	1,017,237
Summerland.....	38,455		38,455
Ventura Avenue.....	48,870	12,269,021	12,317,891
Ventura County.....	32,781	1,127,309	1,160,090
Newhall.....	3,848	100,113	103,961
Elwood.....		5,441,626	5,441,626
Capitan.....		1,440	1,440
Rincon.....		625,825	625,825
San Miguelito.....		252,248	252,248
Santa Barbara Mesa.....	147,432	14,030	161,462
Salt Lake.....	256,159		256,159
Los Angeles.....	146,311		146,311
Montebello.....	215,529	1,945,238	2,160,767
Whittier.....	279,704	118,965	398,669
Coyote.....	32,067	3,694,857	3,716,924
Fullerton.....	243,062	2,768,761	3,011,826
Richfield.....	437,709	1,834,551	2,272,260
Santa Fe Springs.....		22,519,440	22,519,440
Huntington Beach.....	1,114,973	6,937,887	8,052,860
Torrance.....	1,422,611	854,187	2,276,798
Dominguez.....		6,822,815	6,822,815
Rosecrans.....		1,133,905	1,133,905
Inglewood.....	1,934,401	2,930,915	4,865,316
Seal Beach.....		4,533,132	4,533,132
Potrero.....		256,306	256,306
Lawndale.....		105,961	105,961
Playa Del Rey.....	39,204	5,852,791	5,891,995
Newport.....	4,257	1,438	5,695
Long Beach.....	135,904	27,275,405	27,411,309
Totals.....	25,104,493	153,174,837	178,279,330

*Barrels of 42 gallons.

Oil in 'Storage.'

Field, refinery, pipe-line, and tank-farm stocks of crude and refined products in the Pacific Coast territory totaled 168,246,425 barrels December 31, 1931, as compared with 169,835,949 barrels on December 31, 1930. The total decrease in stock for the year was 859,602 barrels.

	<i>Dec. 31, 1932, barrels</i>	<i>Dec. 31, 1931, barrels</i>
Heavy crude and all grades of fuel, gas, and Diesel oils	101,174,293	99,301,196
Refinable crude -----	39,209,041	41,895,200
Finished gasoline, engine distillate, and natural gasoline	15,670,771	15,820,753
Crude gasoline and naphtha distillates-----	4,909,408	4,105,131
All other stocks -----	7,192,912	8,713,669
Totals all stocks-----	168,246,425	169,835,949

Operating Data.

The following tabulation (Table G) is compiled from data published by the State Division of Oil and Gas,¹ semiannually, and here combined to show the entire year's operations for all fields. The districts are the geographical subdivisions as administered by that Division, and which are outlined on the accompanying map.

It will be noted that the State average yield of oil per well per day was 60.4 barrels for the first six months of 1932 and 57.7 barrels for the second. This is somewhat higher than the figure of 52.9 barrels average for December derived from American Petroleum Institute data as shown in Table D, on a previous page, due in part at least, to the fact that the latter is on a full-time basis, whereas the Division's figures allow for shut-down time.

¹ Summary of Operations—California Oil Fields; Division of Oil and Gas, Fifteenth Annual Report of State Oil and Gas Supervisor, Vol. 18, No. 1, July, Aug., Sept., 1932, and No. 3, Jan., Feb., March, 1933.

TABLE G. Production Statistics and Operating Data of California Oil Fields—1932

Field	January 1 to June 30					July 1 to December 31						
	Average number of producing wells—actual	Oil (bbls.)	Number of days producing	Production per well per day (bbls.)		Percent-age of time wells produced	Average number of producing wells—actual	Oil (bbls.)	Number of days producing	Production per well per day (bbls.)		Percent-age of time wells produced
				Oil	Water					Oil	Water	
Distr. 1—Beverly Hills.....	13	64,310	2,181	29.5	21.6	92.2	12	58,494	2,055	28.5	22.1	93.1
Brea-Olinda.....	357	1,569,726	59,028	26.6	15.6	90.8	351	1,503,927	58,711	25.6	16.5	90.9
Coyote Hills.....	136	1,829,803	22,077	82.9	42.3	89.2	89	1,851,947	14,725	35.5	35.5	89.9
Dominguez.....	65	3,660,412	9,505	385.1	83.9	80.3	46	3,189,944	7,791	409.4	98.2	92.0
Huntington Beach*.....	371	3,952,710	59,013	67.0	54.2	87.4	371	3,971,371	59,612	66.6	53.6	87.3
Inglewood.....	214	2,501,139	36,475	68.6	42.7	93.7	219	2,376,462	37,032	64.2	43.9	91.9
Lawndale.....	7	62,717	1,080	58.1	21.5	84.8	7	54,878	1,084	50.6	27.1	84.2
Long Beach*.....	982	14,294,242	167,257	85.5	71.0	93.6	988	13,030,177	166,293	78.4	73.0	91.5
Los Angeles City.....	178	44,430	31,507	1.4	2.1	97.3	170	45,693	30,577	1.5	3.0	97.8
Montebello.....	181	1,175,074	31,316	37.5	86.0	95.1	174	1,024,988	28,920	35.4	92.7	90.3
Newhall.....	61	50,188	11,057	4.5	4.2	99.6	62	50,254	11,330	4.4	3.8	99.3
Playa Del Rey.....	186	3,039,934	30,913	98.3	46.9	91.3	187	2,500,252	32,201	77.6	51.0	93.6
Potrero.....	12	120,657	1,923	62.7	34.8	88.0	11	124,551	1,921	64.8	52.9	94.9
Richfield.....	184	1,165,923	25,026	46.6	11.8	74.7	195	1,135,961	26,867	42.3	11.9	74.9
Rosecrans.....	64	564,581	10,989	51.4	49.6	94.3	65	568,814	11,195	50.8	52.9	93.6
Salt Lake.....	21	72,484	3,627	20.0	54.7	94.9	11	56,761	1,881	30.2	104.9	92.9
Santa Fe Springs.....	497	11,657,089	80,540	144.7	76.1	89.0	535	10,796,972	86,104	125.4	75.9	87.5
Seal Beach.....	111	2,329,533	17,278	134.8	183.0	85.5	108	2,161,793	15,295	141.3	183.9	77.0
Torrance.....	391	1,148,451	63,011	18.2	3.7	88.5	390	1,135,876	64,500	17.6	3.9	89.9
Whittier.....	160	203,804	25,111	8.1	25.4	86.2	160	196,222	26,480	7.4	21.3	89.9
San Bernardino County.....							1	2,472	79	31.3	2.1	42.9
Totals.....	4,191	49,507,207	688,914	71.9	50.6	90.3	4,152	45,837,809	684,653	67.0	51.3	89.6
Distr. 2—Bardsdale.....	72	79,283	12,602	6.3	1.5	96.2	85	75,577	12,440	6.1	1.2	79.5
Conejo.....	26	482	681	0.7	1.8	14.4	29	1,271	4,542	0.3	1.0	85.1
Ojai.....	35	21,416	4,472	4.8	0.2	70.2	35	28,231	5,888	4.8	1.1	91.4
Piru.....	81	95,251	9,985	9.5	5.0	67.7	81	95,261	9,385	9.1	5.4	63.0
Rincon.....	34	369,775	5,472	67.6	24.5	88.4	33	516,800	5,652	91.4	26.2	93.1
Santa Paula.....	19	14,527	2,703	5.4	2.0	78.2	30	15,786	3,766	4.2	1.8	68.2
Sespe.....	25	36,001	3,311	10.9	0.5	72.8	23	31,680	3,400	9.3	0.4	80.3
Simi.....	53	20,845	7,178	2.9	0.9	74.4	45	20,547	7,724	2.7	0.8	93.3
South Mountain.....	72	350,554	9,922	35.3	0.8	75.7	64	314,880	9,775	32.2	0.7	83.0
Ventura.....	148	6,022,626	23,754	253.5	39.2	88.2	154	6,360,683	25,067	253.7	35.9	88.5
Totals.....	565	7,010,760	80,080	87.5	14.4	77.9	579	7,450,716	87,639	85.0	13.0	82.3

TABLE G. Production Statistics and Operating Data of California Oil Fields—1932—Continued

Field	January 1 to June 30					July 1 to December 31						
	Average number of producing wells—actual	Oil (bbls.)	Number of days producing	Production per well per day (bbls.)		Percent- age of time wells produced	Average number of producing wells— actual	Oil (bbls.)	Number of days producing	Production per well per day (bbls.)		Percent- age of time wells produced
				Oil	Water					Oil	Water	
Distr. 3—Arroyo Grande.	20	30,560	3,296	9.3	11.3	90.5	20	35,721	3,029	11.8	17.1	82.3
Capitan.....	1	3,312	40	82.8	4.4	22.0	2	2,483	179	13.9	12.3	48.6
Casmalia.....	10	28,429	1,012	28.1	93.3	55.6	11	52,457	1,312	40.0	96.9	64.8
Cat Canyon.....	12	107,268	2,098	51.1	30.4	96.1	12	89,659	2,157	41.6	25.0	97.7
Elwood.....	43	2,926,977	7,285	401.8	76.9	93.1	43	2,517,140	6,167	408.2	103.1	77.9
Lompoc.....	1	7,065	39	181.2	17.5	21.4	1	4,872	50	97.4	24.9	27.2
Mesa.....	4	35,092	579	60.6	18.3	79.5	6	92,009	907	101.4	35.4	82.2
Santa Maria.....	124	374,050	15,681	23.9	47.9	69.5	125	376,230	14,743	25.5	49.4	64.1
Sargent.....	9	4,484	1,215	3.7	0.2	74.2	8	8,470	1,463	5.8	0.1	99.4
Summerland.....	61	21,879	10,542	2.1	3.9	95.0	79	19,727	14,319	1.4	2.2	98.5
San Luis Obispo County:							1	463	26	17.8	53.4	14.1
Huasna District												
Santa Barbara County:												
More Ranch District :							3	0	0	0	0	0
Totals.....	285	3,539,116	41,787	84.7	37.3	80.6	308	3,199,231	44,352	72.1	37.5	78.3
Distr. 4—Belridge.....	71	1,510,705	12,089	125.0	12.5	93.6	66	1,504,549	10,855	138.6	18.1	89.4
Devils Den.....	0	0	0	0	0	0	0	0	0	0	0	0
Elk Hills.....	206	2,291,734	35,706	64.2	71.2	95.2	193	2,244,821	33,753	66.5	74.0	95.0
Fruitvale.....	31	730,381	5,401	135.2	7.6	95.7	49	895,997	8,135	110.1	7.8	90.2
Kern River.....	971	1,775,328	162,790	10.9	11.4	92.1	943	1,618,133	162,055	10.6	11.1	93.4
Lost Hills.....	80	156,556	13,242	11.8	19.2	90.9	79	147,580	12,557	11.8	15.5	86.4
McKittrick.....												
Tembler.....	122	315,102	20,792	15.2	85.9	93.6	125	319,684	21,528	14.8	88.3	93.6
Midway-Sunset.....	1,809	9,054,197	299,982	30.2	24.4	91.1	1,823	8,935,582	305,560	29.2	25.7	91.9
Mount Poso.....	91	1,461,486	12,853	113.7	83.8	77.6	98	1,458,056	14,398	101.3	85.8	79.8
Round Mountain.....	14	496,304	1,996	248.6	106.9	78.3	19	441,766	2,713	162.8	165.7	77.6
Wheeler Ridge.....	34	95,298	5,991	15.9	3.2	96.8	34	92,152	5,886	15.7	3.0	94.1
Kern County.....	1	3,085	81	38.1	4.0	0	1	4,065	57	71.3	8.4	31.0
Tulare County.....	0	0	0	0	0	0	2	410	30	13.7	59.7	8.2
Totals.....	3,430	17,890,176	570,923	31.3	26.7	91.5	3,432	17,662,795	577,527	30.6	28.1	91.5

Distr. 5—Coalinga.....	663	1,676,026	112,864	14.8	13.6	63.5	653	1,989,615	111,928	17.8	14.2	93.2
Kettleman.....												
Middle Dome.....	1	12,429	12	1,035.8	98.3	6.6	0	0	0	0	0	0
Kettleman.....												
North Dome.....	26	10,898,861	4,169	2,614.3	25.9	88.1	34	11,070,545	5,516	2,007.0	28.3	88.2
Kings County.....							1	0	0	0	0	0
Totals.....	690	12,587,316	117,045	107.5	14.0	93.2	687	13,060,160	117,444	111.2	14.9	92.9
Grand totals.....	9,161	90,534,575	1,498,749	60.4	36.4	89.9	9,158	87,210,711	1,511,615	57.7	37.0	89.7
*The exact production for some wells could not be obtained and the following estimates were incorporated in the above figures:												
Distr. 1—Huntington Beach.....												
Long Beach.....	1	8,056	30				1	4,548	180			
Playa Del Rey.....	1	1,093	30				2	20,591	317			
							1	726	70			

CHAPTER THREE

METALS

Bibliography: Reports of State Mineralogist I-XXVIII (inc.). Bulletins 5, 6, 18, 23, 27, 36, 50, 57, 76, 78, 85, 92, 95. Spurr and Wormser, "Marketing of Metals and Minerals." See also under each metal.

The total value of metals produced in California during 1932 was \$12,364,120. Chief among these is and always has been gold; followed by quicksilver, silver, copper, lead, tungsten, and platinum.

A comparison of the 1932 output with that of the 1931 is afforded by the following table:

Substance	1931		1932		Increase+ Decrease— Value
	Amount	Value	Amount	Value	
Copper.....	12,954,842 lbs.	\$1,178,890	1,417,536 lbs.	\$89,307	\$1,089,583—
Gold.....		10,814,162		11,765,726	951,564+
Lead.....	3,934,240 lbs.	145,568	2,418,626 lbs.	72,480	73,088—
Platinum.....	350 oz.	11,979	336 oz.	8,142	3,837—
Quicksilver.....	13,478 flasks	1,121,624	5,349 flasks	279,780	841,844—
Silver.....	867,818 fine oz.	251,667	493,535 fine oz.	139,176	112,491—
Zinc.....	149,865 lbs.	5,314			5,314—
Unapportioned.....		^a 6,290		9,509	3,219+
Total values.....		\$13,535,494		\$12,364,120	
Net decrease.....					\$1,171,374—

^a Includes iron ore, manganese ore and tungsten.

ALUMINUM

Bibliography: Report XVIII, p. 198. Bulletins 38, 67. U. S. Geol. Surv., Min. Res. of U. S.

To date there has been no commercial production of aluminum ore in California. Only a single authenticated occurrence of bauxite has thus far been noted in this State, being in Riverside County, southeast of Corona, but as yet undeveloped.

ANTIMONY

Bibliography: State Mineralogist Reports VIII, X, XII-XV (inc.), XVII, XXII, XXIII, XXV-XXVII (inc.). Bulletins 38, 91.

During 1932 there were no shipments of antimony ore in California. The principal commercial production of antimony in California has come from Kern, Inyo and San Benito counties, and other occurrences have been noted in Nevada, Riverside, San Bernardino and Santa Clara counties. The commonest occurrence is in the form of the sulphide, stibnite; but in the Kernville and Havilah districts in Kern County there were notable deposits of the native metal, being among the few localities of the world where native antimony has been found.

Present New York quotations (July 27, 1933) are around 7.50¢ (at 7.60¢ per pound for Chinese (duty paid) and American spot antimony.

Antimony Production in California, by Years.

The production of antimony ore in California by years since 1887 has been as follows:

Year	Tons	Value	Year	Tons	Value
1887.....	75	\$15,500	1902.....		
1888.....	100	20,000	1915.....	510	\$35,666
1889.....			1916.....	1,015	64,793
1893.....	50	2,250	1917.....	158	18,786
1894.....	150	6,000	1918.....		
1895.....	33	1,485	1925.....	*26	770
1896.....	17	2,320	1926.....		
1897.....	20	3,500	1927.....	20	590
1898.....	40	1,200	1928.....	20	761
1899.....	75	13,500	1929.....		
1900.....	70	5,700			
1901.....	50	8,350	Totals.....	2,429	\$201,171

* Annual details concealed under 'Unapportioned.'

ARSENIC

Bibliography: Reports XVIII, XXIII, XXV. Bulletin 67. U. S. G. S., Min. Res. of U. S.

Arsenic is found in a number of localities in California in the mineral arsenopyrite (FeAsS), which is frequently gold bearing; and in scorodite ($\text{FeAsO}_4 + 2\text{H}_2\text{O}$), an oxidation product of arsenopyrite. The occurrence of realgar (AsS) has also been noted.

Except for a small output in 1924, there has been no commercial recovery of arsenic from Californian ores. There having been only a single operator, the figures are concealed under the 'Unapportioned' item.

BERYLLIUM

Bibliography: State Mineralogist Report XXVII. Eng. & Min. Jour.-Press, Vol. 118, No. 8, p. 285, Aug. 23, 1924. U. S. Bureau of Mines Information Circular 6190.

Beryllium is a metal resembling aluminum closely in its chemical character. It has a specific gravity of 1.85, is almost as hard as quartz (will scratch glass) and will take a high polish. The use of beryllium as a metal is still more or less in the experimental stage because the cost of extracting the metal from its ores almost makes it prohibitive and the present sources of supply of the ore are limited. Not until such a time when deposits can be found that will assure a definite supply and metallurgical costs are such as to justify its use, will the metal be found in common use.

There are a number of beryllium minerals, but none have been found in commercial quantities, except beryl, which is a beryllium-aluminum silicate. The chief use at present for ground beryl is as an addition to porcelain products, where it reduces the coefficient of expansion. Beryllium metal is difficult to separate from aluminum.

Beryl occurs in California in the pegmatite dikes of the tourmaline gem district in northern San Diego and southwestern Riverside coun-

ties; and an occurrence has recently been noted in western Inyo County, but the quantity is as yet unproved. Thus far there have been no commercial shipments of beryl from California except for gem purposes (the pink and aquamarine varieties).

BISMUTH

Bibliography: Bulletins 38, 67, 91. Am. Jour. Sci., 1903, Vol. 16.

Several bismuth minerals have been found in California, notably native bismuth and bismite (the ochre) in the tourmaline gem district in San Diego and Riverside counties near Pala. Other occurrences of bismuth minerals, including the sulphide, bismuthinite, have been noted in Inyo, Fresno, Nevada, Tuolumne, San Bernardino, and Mono counties, but only in small quantities. The only commercial production recorded was 20 tons valued at \$2,400 in 1904, and credited to Riverside County.

Present quotations for bismuth are around \$1.05 per pound, in ton lots for the refined metal.

CADMIUM

Bibliography: U. S. Geol. Surv., Min. Res. of U. S., 1908, 1918.

During 1917 and 1918, cadmium metal was recovered by the electrolytic zinc plant of the Mammoth Copper Company in Shasta County. It was shipped in the form of 'sticks' and amounted to a total of several thousand pounds for the two years, the exact figures being concealed under 'Unapportioned.' That was the first, and thus far the only, commercial production of cadmium recorded from Californian ore. Cadmium occurs there associated with zinc sulphide, sphalerite. Cadmium also occurs in the Cerro Gordo Mines, Inyo County, associated with smithsonite (zinc carbonate).

Present quotations for cadmium are 55¢ per pound for the refined metal.

COBALT

Bibliography: Report XIV. Bulletins 67, 91. U. S. G. S., Min. Res. of U. S., 1912, 1918. U. S. B. M., I. C. 6331.

Occurrences of some of the cobalt minerals have been noted in several localities in California, but to date no commercial production has resulted. Some of the copper ores of the foothill copper belt in Mariposa and Madera counties have been found to contain cobalt up to 3%.

The nominal quotation for cobalt is around \$2.50 per pound for the refined metal—35% for cash.

COPPER

Bibliography: State Mineralogist Reports VIII–XXVII (inc.). Bulletins 23, 50, 91.

The output of copper in California during 1932 amounted to a total of 1,427,536 pounds of recoverable metal valued at \$89,307. This was a decrease in both quantity and value as compared with the 1931 production which was 12,954,842 pounds worth \$1,178,890. The average price

of copper in 1932 was 6.3¢ per pound compared with 9.1¢ in 1931, 13.0¢ in 1930, 17.6¢ in 1929 and 14.4¢ in 1928. The average price of the year is the lowest on record.

Copper has been second to gold among the metals in California since 1896 until 1932, when it was passed in value of output by both quick-silver and silver.

The distribution of the 1932 output in California by counties was as follows:

<i>County</i>	<i>Pounds</i>	<i>Value</i>
Alameda -----	12,545	\$790
Amador -----	1,454	92
Butte -----	715	45
El Dorado -----	850	54
Inyo -----	12,672	798
Mono -----	3,970	250
Nevada -----	33,454	2,108
Plumas -----	1,043,390	65,734
San Bernardino -----	6,138	387
Shasta -----	295,981	18,647
Sierra -----	5,395	340
Alpine, Calaveras, Kern, Mariposa, Placer, Riverside, and Tulare * -----	972	62
Totals -----	1,417,536	\$89,307

* Combined to conceal the output of a single operator in each.

Copper Production of the United States.

According to preliminary data issued by the U. S. Bureau of Mines,¹ the smelter production of primary copper from domestic sources during 1932 amounted to 544,009,948 pounds, a decrease of approximately 48 per cent compared with 1931 output. The value decreased approximately 64 per cent in 1932. The average price of 969,116,249 pounds of copper delivered during the year, as reported to the U. S. Bureau of Mines by selling agents, was 6.3¢ per pound.

Copper Production of California, by Years.

Although some mining of copper ores in a small way had been done earlier, shipments in appreciable quantities began in 1861 and continued of importance up to the end of 1867, when a total of 68,631 tons (of 2376 pounds) of high-grade ores, and 847 tons of matte or 'regulus'² had been shipped to smelters at New York, Boston, and Swansea, Wales. The most important district at that time was Copperopolis and vicinity in Calaveras County, with some shipments also made from Mariposa, El Dorado, Fresno and San Luis Obispo counties. From 1868 to 1882, the output was insignificant. There are wide discrepancies in the figures currently recorded for copper production previous to 1882, in which year the data of the U. S. Geological Survey began. The detailed statistics of the California State Mining Bureau began in the year 1894.

Amount and value of copper production in California annually since 1882 is given in the following tabulation:

¹ U. S. Bureau of Mines, Mineral Market Report, M. M. S. 203, May 20, 1933.

² Brown, J. Ross, Mineral Resources West of the Rocky Mountains, p. 168, 1867.

Copper Production of California, by Years

Year	Pounds	Value	Year	Pounds	Value
1882.....	826,695	\$144,672	1909.....	65,727,736	\$8,478,142
1883.....	1,600,862	265,743	1910.....	53,721,032	6,680,641
1884.....	876,166	120,911	1911.....	36,838,024	4,604,753
1885.....	469,028	49,248	1912.....	34,169,997	5,638,049
1886.....	430,210	43,021	1913.....	34,471,118	5,343,023
1887.....	1,600,000	192,000	1914.....	30,491,535	4,055,375
1888.....	1,570,021	235,303	1915.....	40,968,966	7,169,567
1889.....	151,505	18,180	1916.....	55,809,019	13,729,017
1890.....	23,347	3,502	1917.....	48,534,611	13,249,948
1891.....	3,397,405	424,675	1918.....	47,793,046	11,805,883
1892.....	2,980,944	342,808	1919.....	22,162,605	4,122,246
1893.....	239,682	21,571	1920.....	12,947,299	2,382,303
1894.....	738,594	72,486	1921.....	12,088,053	1,559,358
1895.....	225,650	21,901	1922.....	22,883,987	3,090,582
1896.....	1,992,844	199,519	1923.....	28,346,860	4,166,989
1897.....	13,638,626	1,540,666	1924.....	52,089,349	6,823,704
1898.....	21,543,229	2,475,168	1925.....	46,968,499	6,669,527
1899.....	23,915,486	3,990,534	1926.....	33,521,544	4,693,014
1900.....	29,515,512	4,748,242	1927.....	27,350,316	3,582,888
1901.....	34,931,788	5,501,782	1928.....	25,162,304	3,623,360
1902.....	27,860,162	3,239,975	1929.....	33,809,258	5,941,799
1903.....	19,113,861	2,520,997	1930.....	26,534,752	3,449,522
1904.....	29,974,154	3,969,995	1931.....	12,954,842	1,178,890
1905.....	16,997,489	2,650,605	1932.....	1,417,536	89,307
1906.....	28,726,448	5,522,712			
1907.....	32,602,945	6,341,387			
1908.....	40,868,772	5,350,777			
			Totals.....	1,143,573,713	\$182,136,267

GOLD

Bibliography: State Mineralogist Reports I to XXVIII (inc.), (except III and VIII). Bulletins 36, 45, 57, 91, 92, 95. U. S. Geol. Surv., Prof. Paper 73. U. S. Bur. of Mines, Econ. Paper 3 (1929).

Gold was first, and, for many years, the most important single mineral product of California. Although now surpassed for a number of years in annual value by petroleum, and by natural gas beginning with 1923, it still heads our metal list, and California continues to outrank all the other gold-producing States of the United States, including Alaska. In fact, at present, California is producing approximately 23% of the gold mined in the entire United States.

There has been a steady increase in the development of both lode and placer mines in California during the last four or five years, brought about by the present economic conditions. During 1932 there were 1538 operators in California, not including snipers, prospectors and various individuals, selling gold in small lots to the bullion dealers. It is estimated that there were 12,000 to 15,000 of the latter class operating in the State, most of whom were people who could not find employment in other lines. They accounted for (23,870 fine ounces) \$493,437 of the 1932 output. This was in 30,880 lots which ranged from 9 cents to \$100 and sold to the licensed bullion buyers, numbering 94. The average value of each lot sold was \$16. The average amount recovered was \$41.12 by an individual for his efforts over a period of approximately 90 days. There was no premium paid on gold during 1932, the price being \$20.67 a fine ounce. On August 29, 1933, there was an executive order lifting the embargo on gold ores, concentrates, precipitates, and unretorted amalgam, followed on October 25,

1933, by another order instructing the Reconstruction Finance Corporation to buy newly-mined gold at a price fixed by the U. S. Treasurer which corresponds to the world price, all of which will have an effect on the 1933 gold yield.

The production of gold in California for 1932 totaled 569,166.99 fine ounces worth \$11,765,726, being an increase of 46,031.90 fine ounces over the 1931 yield. The deep or lode mines accounted for 338,637.13 fine ounces worth \$7,000,251 and the placers (mainly dredges) produced 230,529.86 fine ounces worth \$4,765,475.

As the Division of Mines has never independently gathered the statistics of gold and silver production, these figures, as in former years, are published by cooperation with and through the courtesy of Mr. V. C. Heikes and Mr. Charles White Merrill of the Division of Minerals and Statistics, U. S. Bureau of Mines.



Hydraulicking at Canyon Creek Placer Mine, near Dedrick, Trinity County.

Photo by Walter W. Bradley.

The largest production for 1932 was reported from Nevada County with an output of 176,123.55 fine ounces (\$3,640,797); Sacramento County second with 101,599.57 fine ounces (\$2,100,250); Amador County third with 63,262.88 fine ounces (\$1,307,760); followed in turn by Yuba, Sierra, Shasta, Merced and Trinity counties. Nevada held the first place as a gold producing county with an output exceeding that of Yuba or Amador which held first and second places respectively in 1928 with Sacramento fourth that year. Sacramento held second place in 1931, its output exceeding that of Amador, which held second place in 1930. The gold from Yuba and Sacramento comes almost entirely from dredges, while that from Nevada and Amador counties comes mainly from the lode mines.

Distribution of the 1932 gold output by counties was as follows:

County	Number of operators ^a		Value
	Placer	Lode	
Alpine.....		2	\$647
Amador.....	17	34	1,307,760
Butte.....	51	16	265,589
Calaveras.....	48	67	186,378
Colusa.....		1	371
Del Norte.....	18		2,195
El Dorado.....	51	52	182,043
Fresno.....	6	5	12,445
Humboldt.....	10		2,549
Imperial.....	4	6	16,212
Inyo.....	4	38	42,113
Kern.....	19	61	296,250
Lassen.....		3	460
Los Angeles.....	16		6,691
Madera.....	6	9	9,230
Mariposa.....	13	59	169,627
Merced.....	5		391,017
Modoc.....		3	2,083
Mono.....	1	9	26,333
Monterey.....	2	2	794
Nevada.....	47	36	3,640,797
Placer.....	63	23	104,089
Plumas.....	41	14	76,781
Riverside.....	3	17	20,788
Sacramento.....	9		2,100,250
San Bernardino.....	16	61	137,979
San Diego.....	2	11	5,573
San Joaquin.....	2		1,440
San Luis Obispo.....	2		1,021
Shasta.....	45	26	529,935
Sierra.....	62	26	590,294
Siskiyou.....	125	43	133,115
Stanislaus.....	13	1	152,865
Trinity.....	77	16	294,297
Tulare.....		1	141
Tuolumne.....	24	67	93,939
Ventura.....	1	2	887
Yuba.....	25	6	960,749
Totals.....	828	717	\$11,765,726

^a Number does not include snipers, prospectors and various individuals selling small lots to bullion dealers.

The following is quoted from the advanced statement of gold in 1932 by courtesy of the U. S. Bureau of Mines,^b Department of Commerce:

"The total recoverable gold in ore and gravels treated in California in 1932, according to V. C. Heikes and Charles White Merrill of the United States Bureau of Mines, was valued at \$11,765,726, of which 718 lode mines yielded \$7,000,251 and placers (including dredges) \$4,765,475. Compared with the gold yield in 1931 this was an increase of \$951,564, with the placer mines showing the larger increase in output. Of the total gold yield in 1932, lode mining produced 59 per cent and placer mining 41 per cent. Only three counties had a production of gold exceeding \$1,000,000 and these, in order of rank, were Nevada, Sacramento, and Amador. Of the lode gold output gold ore, old tailings, and mill cleanings yielded approximately 99 per cent. Of the placer gold output dredges yielded 82 per cent, surface placers 11 per cent, drift placers 4 per cent, and hydraulic placers 3 per cent. The gold output of 22 dredges (22 in 1931) was 8 per cent more than in the preceding year. Thirty-five properties in the State produced more than 1000 ounces of gold each and contributed approximately 86 per cent of the total gold output."

"The production of gold in California in 1932 (\$11,774,677) constituted 98 per cent of the calculated gross value of recovered metals from that State (gold, silver, copper, and lead). The increase (\$960,515) of gold production in 1932 over 1931 was 8.88 per cent. The greater part of the gold produced in California in 1932 was from old-established lode mines, such as the Empire-North Star and Idaho Maryland in Nevada County; the Original Sixteen to One and the Kate Hardy in Sierra County; the Argonaut, Central Eureka, and Kennedy in Amador County; and the Yellow Aster in Kern County. Twenty-two bucket dredges in 1932 in Amador, Butte, Calaveras, Merced, Sacramento, Shasta, Stanislaus, Trinity, and Yuba counties produced 188,730 ounces of gold valued at \$3,901,395 from 48,851,063 cubic yards of gravel, with an average recovery of 8 cents a cubic yard in gold. In 1931 the bucket-dredge gold production was \$3,819,355 from 22 dredges handling 44,423,652

^b U. S. Bureau of Mines, Department of Commerce advanced statement for 1932, and Mineral Yearbook 1932-33, pp. 21-22.

cubic yards of gravel. Another dredge was added to the Folsom field by the Gold Hill Dredging Co., which moved its 9-cubic foot dredge from Dayton, Nev., for operation on the American River. The Cal-Oro Dredging Co. completed its dredge boat, which began digging early in 1933 on gravel south of Yuba, Siskiyou County. The gold output obtained from drift placers in California in 1932 was nominal. Since the beginning of floating bucket dredging in the Oroville district \$174,526,417 in gold has been produced. Of this total output of the State, the Feather River field is credited with \$33,621,406, the Yuba River field with \$67,049,597, and the American River field with \$44,793,178. The California Debris Commission (since 1884, an organization to regulate hydraulic mining after the farming interests won their suit to prevent debris from being dumped into the rivers) in 1932 granted 44 hydraulic placer mines permission to operate; 1062 applications for licenses are pending. Small-scale mining, taken up in 1931 in the form of panning and rocking by the unemployed in all western mining States, was more successful in 1932 in California than in any other State. Ninety-four bullion buyers in California, including banks, merchants, and private refiners, all licensed by the State Mineralogist of California to purchase gold, in 1932 sold to the San Francisco Mint and other refiners 23,870 fine ounces, or \$493,437 in new gold. This total compares with \$162,000 in gold purchased by bullion buyers in 1931. Their reports indicate that 12,000 (out of a probable 80,000 individuals) produced 30,880 lots of new gold consisting of gold dust, nuggets, and amalgam ranging in value from 9 cents to as much as \$100. The average amount received by these 12,000 amateur prospectors for their labors during the season or year was \$41.12."



Washing gravel on a bar in the Yuba River near Smartsville, Yuba County.

Photo by Walter W. Bradley.

Total Gold Production of California.

The presence of gold in stream gravels near Los Angeles was known and worked in a small way by the Indians, at least as early as 1841,¹ and possibly 1820.² On March 2, 1844, Don Manuel Castanares, deputy for California to the Congress of Mexico, reported³ to his government that placers near Los Angeles had produced up to December, 1843, a total of 2000 ounces of gold dust, most of which had been sent to the United States Mint at Philadelphia.

As the padres and the rancheros discouraged the quest of gold, this early, small production caused no particular excitement. It was not until James W. Marshall's finding of gold nuggets in the tail-race of

¹ Hittell, T. H., *History of California*, Vol. II, p. 312, 1885.

² Bancroft, H. H., *History of California*, Vol. II, p. 417, 1886.

³ *Mercantile Trust Review of the Pacific*, Vol. XIV, No. 2, p. 43, Feb. 15, 1925.

Sutter's saw mill on the American River, January 24, 1848, was heralded abroad that the great rush began, and California became a commonwealth of first rank almost over night. There are, however, no authentic data on gold production prior to 1848, other than occasional, scattered references such as above quoted.

The following table was originally compiled by Chas. G. Yale, of the Division of Mineral Resources, U. S. Geological Survey, but for a number of years statistician of the California State Mining Bureau and the U. S. Mint at San Francisco. The authorities chosen for certain periods were: J. D. Whitney, state geologist of California; John Arthur Phillips, author of "Mining and Metallurgy of Gold and Silver" (1867); U. S. Mining Commissioner R. W. Raymond; U. S. Mining Commissioner J. Ross Browne; Wm. P. Blake, Commissioner from California to the Paris Exposition, where he made a report on "Precious Metals" (1867); John J. Valentine, author for many years of the annual report on precious metals published by Wells, Fargo & Company's Express; and Louis A. Garnett, in the early days manager of the San Francisco refinery, where records of gold receipts and shipments were kept. Mr. Yale obtained other data from the reports of the director of the U. S. Mint and the director of the U. S. Geological Survey. The authorities referred to who were alive at the time of the original compilation of this table in 1894 were all consulted in person or by letter by Mr. Yale with reference to the correctness of their published data, and the final table quoted was then made up.

The figures for 1903-1923 (inclusive) are those prepared by the U. S. Geological Survey; and since by the U. S. Bureau of Mines:

Total Gold Production of California

Year	Value	Year	Value
1848.....	\$245,301	1892.....	\$12,571,900
1849.....	10,151,360	1893.....	12,538,780
1850.....	41,273,106	1894.....	13,863,282
1851.....	75,938,232	1895.....	15,334,317
1852.....	81,294,700	1896.....	17,181,562
1853.....	67,613,487	1897.....	15,871,401
1854.....	69,433,931	1898.....	15,906,478
1855.....	55,485,395	1899.....	15,336,031
1856.....	57,509,411	1900.....	15,863,355
1857.....	43,628,172	1901.....	16,989,044
1858.....	46,591,140	1902.....	16,910,320
1859.....	45,846,599	1903.....	16,300,653
1860.....	44,095,163	1904.....	18,633,676
1861.....	41,884,995	1905.....	18,898,545
1862.....	38,854,668	1906.....	18,732,452
1863.....	23,501,736	1907.....	16,727,928
1864.....	24,071,423	1908.....	18,761,559
1865.....	17,930,858	1909.....	20,237,870
1866.....	17,123,867	1910.....	19,715,440
1867.....	18,265,452	1911.....	19,738,908
1868.....	17,555,867	1912.....	19,713,478
1869.....	18,229,044	1913.....	20,406,958
1870.....	17,458,133	1914.....	20,653,496
1871.....	17,477,885	1915.....	22,442,296
1872.....	15,482,194	1916.....	21,410,741
1873.....	15,019,210	1917.....	20,087,504
1874.....	17,264,836	1918.....	16,528,953
1875.....	16,876,009	1919.....	16,695,955
1876.....	15,610,723	1920.....	14,311,043
1877.....	16,501,268	1921.....	15,704,822
1878.....	18,839,141	1922.....	14,670,346
1879.....	19,626,654	1923.....	13,379,013
1880.....	20,030,761	1924.....	13,150,175
1881.....	19,223,155	1925.....	13,065,330
1882.....	17,146,416	1926.....	11,923,481
1883.....	24,316,873	1927.....	11,671,018
1884.....	13,600,000	1928.....	10,785,315
1885.....	12,661,044	1929.....	8,526,703
1886.....	14,716,506	1930.....	9,451,162
1887.....	13,588,614	1931.....	10,814,162
1888.....	12,750,000	1932.....	11,765,726
1889.....	11,212,913		
1890.....	12,309,793		
1891.....	12,728,869		
		Total value.....	\$1,864,236,082

IRIDIUM (see under Platinum)

IRON ORE

Bibliography: State Mineralogist Reports II, IV, V, X, XII-XV (inc.), XVII, XVIII, XXI-XXVII (inc.). Bulletins 38, 67, 91. Am. Inst. Min. Eng., Trans. LIII. Min. & Sci. Press, Vol. 115, pp. 112, 117-122; Vol. 123, pp. 94-96, 113-114.

During 1932 there was no iron ore reported mined in California. There are considerable deposits of iron ore known in California, notably in Shasta, Madera, Placer, Riverside, San Bernardino, and Los Angeles counties, but production has so far been limited for lack of an economic supply of coking coal. Some pig iron has been made, utilizing charcoal for fuel, both in blast furnaces and by electrical reduction; also, ferrochrome, ferromanganese, and ferrosilicon have been made in California.

Total Iron Ore Production of California.

Total iron ore production of California, with annual amounts and values, is as follows:

Year	Tons	Value	Year	Tons	Value
1881*	9,273	\$79,452	1915	724	\$2,584
1882	2,073	17,766	1916	3,000	6,000
1883	11,191	106,540	1917	2,874	11,496
1884	4,532	40,983	1918	3,108	15,947
1885			1919	2,300	13,796
1886	3,676	19,250	1920	5,975	40,889
1887			1921	1,970	12,030
1893	250	2,000	1922	3,588	18,868
1894	200	1,500	1923	3,102	18,665
1895			1924		
1907	400	400	1925	785	4,710
1908			1926		
1909	108	174	1927	5,272	26,000
1910	579	900	1928		
1911	558	558	1930		
1912	2,508	2,508	1931	100	700
1913	2,343	4,485	1932		
1914	1,436	5,128			
			Totals	71,905	\$553,329

*Productions for the years 1881-1886 (inc.) were reported as "tons of pig iron" (U.S.G.S., Min. Res. 1885), and for the table herewith are calculated to "tons of ore" on the basis of 47.6% Fe as shown by an average of analyses of the ores (State Mineralogist Report IV, p. 242). This early production of pig iron was from the blast furnaces then in operation at Hotaling in Placer County. Charcoal was used in lieu of eoke. Though producing a superior grade of metal, they were obliged finally to close down, as they could not compete with the cheaper English and eastern United States iron brought in by sea to San Francisco.

^a Annual details concealed under 'Unapportioned.'

LEAD

Bibliography: State Mineralogist Reports IV, VIII-XV (inc.), XVII-XXVII (inc.).

The production of lead in California during 1932 was 2,418,626 pounds of recoverable metal valued at \$72,480, as compared with the 1931 figures which were 3,934,240 pounds worth \$145,568. The average price of lead in 1932 was 3.0¢ per pound, compared with 3.7¢ per pound in 1931, 5.0¢ per pound in 1930, and 6.3¢ per pound in 1929.

Distribution of the 1932 output by counties was as follows:

County	Pounds	Value
Amador	2,981	\$89
Calaveras	642	19
Inyo	2,204,108	66,123
Mono	33,401	1,002
Nevada	82,119	2,464
San Bernardino	23,371	701
Sierra	69,490	2,005
Stanislaus	607	18
Alpine, Butte, El Dorado, Kern, Los Angeles, Mariposa, River-side, Shasta, Siskiyou, and Trinity *	1,907	59
Totals	2,418,626	\$72,480

* Combined to conceal the output of a single operator in each.

Lead Production of the United States.

According to preliminary data issued by the U. S. Bureau of Mines ¹ during 1932, the production of primary lead in the United States was 255,337 short tons, valued at \$15,320,000, being a decrease from the national production of 1931 which was 390,260 short tons worth \$28,-877,000 due to decreased selling price of lead from an average of 3.7¢ in 1931 to 3¢ per pound in 1932.

¹ U. S. Bureau of Mines Mineral Market Report No. 190, April 19, 1933.

Lead Production of California, by Years.

Statistics on lead production in California were first compiled by this Bureau in 1887. Amount and value of the output, annually, with total figures, to date, are given in the following table:

Total Production of Lead in California, by Years

Year	Pounds	Value	Year	Pounds	Value
1877-----	^a 7,836,000	\$391,800	1906-----	338,718	\$19,307
1878-----	8,640,000	328,320	1907-----	328,681	16,690
1879-----	4,502,000	191,335	1908-----	1,124,483	46,663
1880-----	4,200,000	215,460	1909-----	2,685,477	144,897
1881-----	6,680,000	325,316	1910-----	3,016,902	134,082
1882-----	^b 4,000,000	196,800	1911-----	1,403,839	63,173
1883-----	^c 3,400,000	145,520	1912-----	1,370,067	61,653
1884-----	3,200,000	120,512	1913-----	3,640,951	160,202
1885-----	2,000,000	80,900	1914-----	4,697,400	183,198
1886-----	2,000,000	93,400	1915-----	4,796,299	225,426
1887-----	^d 1,160,000	52,200	1916-----	12,392,031	855,049
1888-----	900,000	38,250	1917-----	21,651,352	1,862,016
1889-----	940,000	35,720	1918-----	13,464,869	956,006
1890-----	800,000	36,000	1919-----	4,139,562	219,397
1891-----	1,140,000	49,020	1920-----	4,903,738	392,300
1892-----	1,360,000	54,400	1921-----	1,149,051	51,707
1893-----	666,000	24,975	1922-----	6,511,280	358,120
1894-----	950,000	28,500	1923-----	9,934,522	695,416
1895-----	1,592,400	49,364	1924-----	4,984,387	398,751
1896-----	1,293,500	38,805	1925-----	7,352,422	639,661
1897-----	596,000	20,264	1926-----	8,067,873	645,429
1898-----	655,000	23,907	1927-----	2,748,440	173,151
1899-----	721,000	30,642	1928-----	1,882,795	109,102
1900-----	1,040,000	41,600	1929-----	1,428,777	90,014
1901-----	720,500	28,820	1930-----	3,542,796	176,241
1902-----	349,440	12,230	1931-----	3,934,240	145,568
1903-----	110,000	3,960	1932-----	2,418,626	72,480
1904-----	124,000	5,270			
1905-----	533,680	25,083	Totals-----	193,019,098	\$11,584,072

^a Quantities for 1877-1881 (inc.) from C. E. Siebenthal, Mineral Resources of U. S. 1912, Part I, U. S. Geol. Survey, p. 339; and values for same years from quotations in Eng. & Min. Jour. of New York.

^b Estimated.

^c Quantities and values for 1883-1886 (inc.) from Mineral Resources of U. S. Geol. Surv., 1883-1886, respectively.

^d Data from 1887 to date from reports of California State Mining Bureau.

MANGANESE

Bibliography: State Mineralogist Reports XII-XV (inc.), XVIII, XXII-XXVII (inc.). Bulletins 38, 67, 76, 91. U. S. G. S., Bull. 427. Eng. & Min. Jour.-Press, Vol. 117, p. 545.

During 1932 there was no manganese ore reported produced in California.

Imports of foreign manganese ore into the United States¹ during 1932, mainly from Soviet Russia, Gold Coast and Brazil, amounted to a total of 124,022 short tons of ore containing 53,553 tons of manganese valued at \$1,219,383, compared with 562,821 tons of ore valued at \$5,104,590 in 1931.

The Tariff Act of 1930 provides for an import duty of 1¢ per pound on the metallic manganese contained, for "manganese ore (including ferruginous manganese ore) or concentrates containing in excess of 10 per centum of metallic manganese."

¹ U. S. Bureau of Foreign and Domestic Commerce, Monthly Summary, Dec., 1932.

Manganese Ore Production in California, by Years.

Production of manganese ore in California began at the Ladd Mine, San Joaquin County, in the Tesla District in 1867. When shipments of this ore to England ceased late in 1874, upwards of 5000 tons had been produced by that property. For some years following that, the output was small. The tabulation herewith shows California's output of manganese ore, annually, since 1887, when the compilation of such figures was begun by the State Mining Bureau:

Year	Tons	Value	Year	Tons	Value
1887.....	1,000	\$9,000	1911.....	2	\$40
1888.....	1,500	13,500	1912.....	22	400
1889.....	53	901	1913.....		
1890.....	386	3,176	1914.....	150	1,500
1891.....	705	3,830	1915.....	4,013	49,098
1892.....	300	3,000	1916.....	13,404	274,601
1893.....	270	4,050	1917.....	15,515	396,659
1894.....	523	5,512	1918.....	26,075	979,235
1895.....	880	8,200	1919.....	11,569	451,422
1896.....	518	3,415	1920.....	2,892	62,323
1897.....	504	4,080	1921.....	1,005	12,210
1898.....	440	2,102	1922.....	540	7,650
1899.....	295	3,165	1923.....	690	10,620
1900.....	131	1,310	1924.....	1,115	25,785
1901.....	425	4,405	1925.....	832	19,450
1902.....	870	7,140	1926.....	235	4,700
1903.....	1	25	1927.....		
1904.....	60	900	1928.....		
1905.....			1929.....	733	8,216
1906.....	1	30	1930.....		
1907.....	1	25	1931.....	207	2,576
1908.....	321	5,785	1932.....		
1909.....	3	75			
1910.....	265	4,235	Totals.....	88,451	\$2,394 346

* Annual details concealed under 'Unapportioned.'

MOLYBDENUM

Bibliography: State Mineralogist Reports XIV, XVII-XXIV (inc), XXVI, XXVII. Bulletins 67, 91. U. S. Bur. of Min., Bulletin 111. Proc. Colo. Sci. Soc., Vol. XI.

Molybdenum is used as an alloy constituent in the steel industry, and in certain forms of electrical apparatus. Included in the latter is its successful substitution for platinum and platinum-iridium in electric contact-making and -breaking devices. In alloys it is used similarly to and in conjunction with chromium, cobalt, iron, manganese, nickel, tungsten, and vanadium. The oxides and the ammonium salt have important chemical uses.

The two principal molybdenum minerals are: the sulphide, molybdenite, and wolfenite, lead molybdate; the former furnishing practically the entire commercial output. Molybdenite is found in or associated with acidic igneous rocks, such as granite and pegmatite.

Deposits of disseminated molybdenite are known in several localities in California, and in at least two places it occurs in small masses associated with copper sulphides. The only recorded commercial shipments of molybdenum ore in California were during the war 1916-1918. Some development work has been recently done on a high-grade deposit at the head of the Kaweah River, Tulare County.

The Tariff Act of 1930 provides for an import duty of 35 cents a pound for the metallic molybdenum content of molybdenum ores or concentrates.

The present quotations on molybdenum ores are 42¢ per pound of MoS₂ contained, delivered at Pittsburgh, Pa., and on ferromolybdenum are 95¢ per pound Mo, 50%-60% Mo f.o.b. shipping point.

Molybdenum Production of California, by Years.

California's production of molybdenum ore by years is summarized in the following tabulation:

Year	Tons	Value
1916 -----	8	\$9,945
1917 -----	243	9,014
1918 -----	*	300
Totals -----	251	\$19,259

* 300 pounds of 90% MoS₂ concentrate.

NICKEL

Bibliography: State Mineralogist Reports XIV, XVII, XXIV, XXV. U. S. G. S., Bulletin 640-D. U. S. Bureau of Standards, Circular 100.

Nickel occurs in the Friday Copper Mine in the Julian District, San Diego County. The ore is a nickel-bearing pyrrhotite, with some associated chalcopyrite. Some ore has been mined in the course of development work but not treated nor disposed of, as they were unable to get any smelter to handle it for them. Nickel ore has also been reported from other localities in California, but not yet confirmed.

Present quotations for nickel are around 35¢-36¢ per pound for the refined metal.

OSMIUM (see under Platinum)

PALLADIUM (see under Platinum)

PLATINUM

Bibliography: State Mineralogist Reports IV, VIII, IX, XII-XXVI (inc.). Bulletins 38, 45, 67, 85, 91, 92. U. S. Geol. Surv., Bulletins 193, 285. Trans. Am. Inst. Min. Eng., Vol. 47, pp. 217-218.

In California the platinum group metals are obtained as a by-product from placer operations for gold. The major portion of it comes from the dredges working in Amador, Butte, Sacramento, Stanislaus, Shasta and Yuba counties, with a small amount coming from the hydraulic and surface-sluicing mines of Del Norte, Humboldt, Siskiyou and Trinity counties.

The production of platinum group metals in California during 1932 totaled 336 ounces crude, containing 278 fine ounces valued at \$8,142 compared with 305 fine ounces worth \$11,979 in 1931. This metal came from properties in Butte, Del Norte, El Dorado, Humboldt Merced, Plumas, Sacramento, Shasta, Stanislaus and Trinity counties. Of the above 278 fine ounces: 186 ounces were platinum; 42 ounces, iridium; 37 ounces, osmium; 11 ounces, osmiridium, and 2 ounces palladium.

Price.

The average prices during 1932 for the various platinum group metals per fine ounce, according to refiners' reports, as given by the U. S. Bureau of Mines^a were: platinum, \$31.76; palladium, \$17.75; iridium, \$59.15; osmium, \$52.50; rhodium, \$46.50; and ruthenium, \$41.20, compared with the 1931 prices, which were: platinum, \$31.67; palladium, \$18.14; iridium, \$114.36; osmium, \$59.33; rhodium, \$42.57; and ruthenium, \$40.95.

Platinum Production of California, by Years.

The annual production and values since 1887 have been as follows:

Year	Ounces	Value	Year	Ounces	Value
1887	416	\$10,400	1911	511	\$14,873
1888	100	400	1912	603	19,731
1889	500	2,000	1913	368	17,738
1890	500	2,000	1914	463	14,816
1891	600	2,500	1915	667	21,149
1892	100	500	1916	886	42,642
1893	80	440	1917	610	43,719
1894	75	517	1918	571	42,788
1895	100	600	1919	*418	60,611
1896	150	900	1920	477	68,977
1897	162	944	1921	613	58,754
1898	150	900	1922	795	90,288
1899	300	1,800	1923	602	78,546
1900	300	1,800	1924	273	36,452
1901	400	2,500	1925	292	39,937
1902	250	3,200	1926	322	32,005
1903	39	468	1927	139	10,749
1904	70	1,052	1928	312	27,902
1905	123	1,849	1929	212	14,416
1906	200	3,320	1930	217	11,700
1907	91	1,647	1931	305	11,979
1908	300	6,255	1932	278	8,142
1909	706	13,414			
1910	337	8,386	Totals	15,977	\$835,706

* Fine ounces, beginning with 1919.

QUICKSILVER

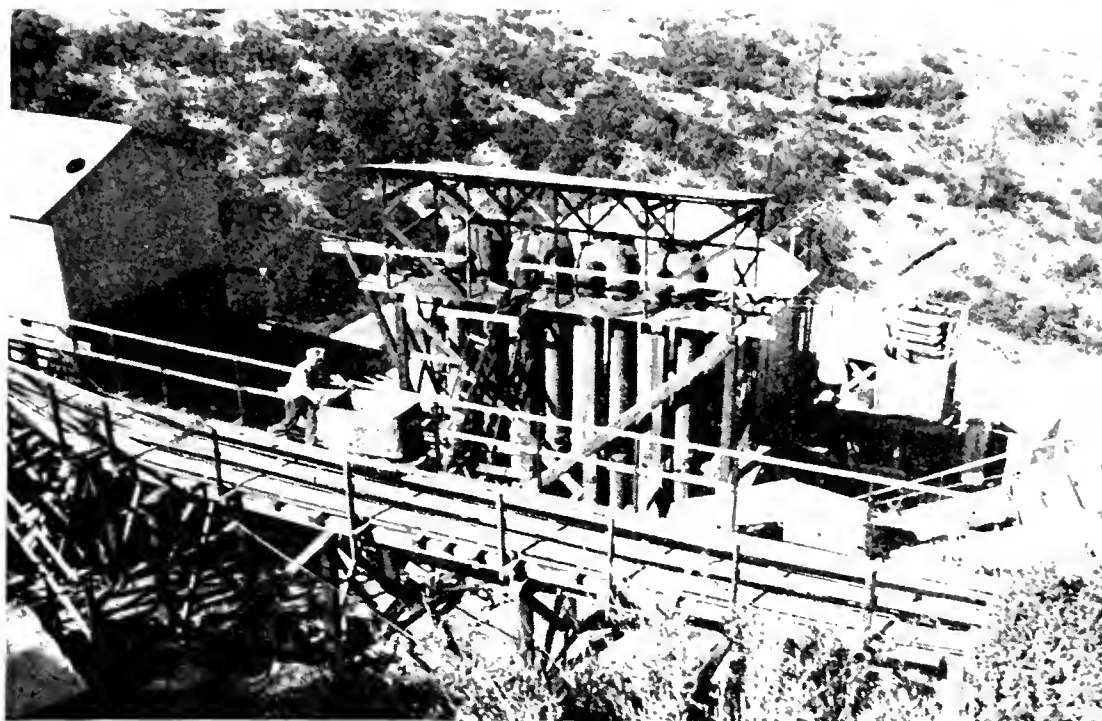
Bibliography: State Mineralogist Reports IV, V, XII-XV, XVII-XXVII (inc.). Bulletins 27, 78, 91. U. S. Geol. Surv., Monograph XIII. U. S. Bur. of Mines, Tech. Papers 96, 227; Bulletin 222, 335.

The production of quicksilver in California during 1932 was 5349 flasks valued at \$279,780. This was a decrease in both quantity and value, as compared with the 1931 output, which was 13,478 flasks worth \$1,121,624. The distribution of the 1932 output of quicksilver by counties was as follows:

County	Flasks	Value
Lake	1,038	\$57,850
Napa	647	34,634
San Benito	594	31,036
San Luis Obispo	2,035	106,508
Santa Barbara	129	6,459
Sonoma	247	11,642
Colusa, Contra Costa, Fresno, Inyo, Orange, Santa Clara, Siskiyou, and Trinity*	659	31,651
Totals	5,349	\$279,780

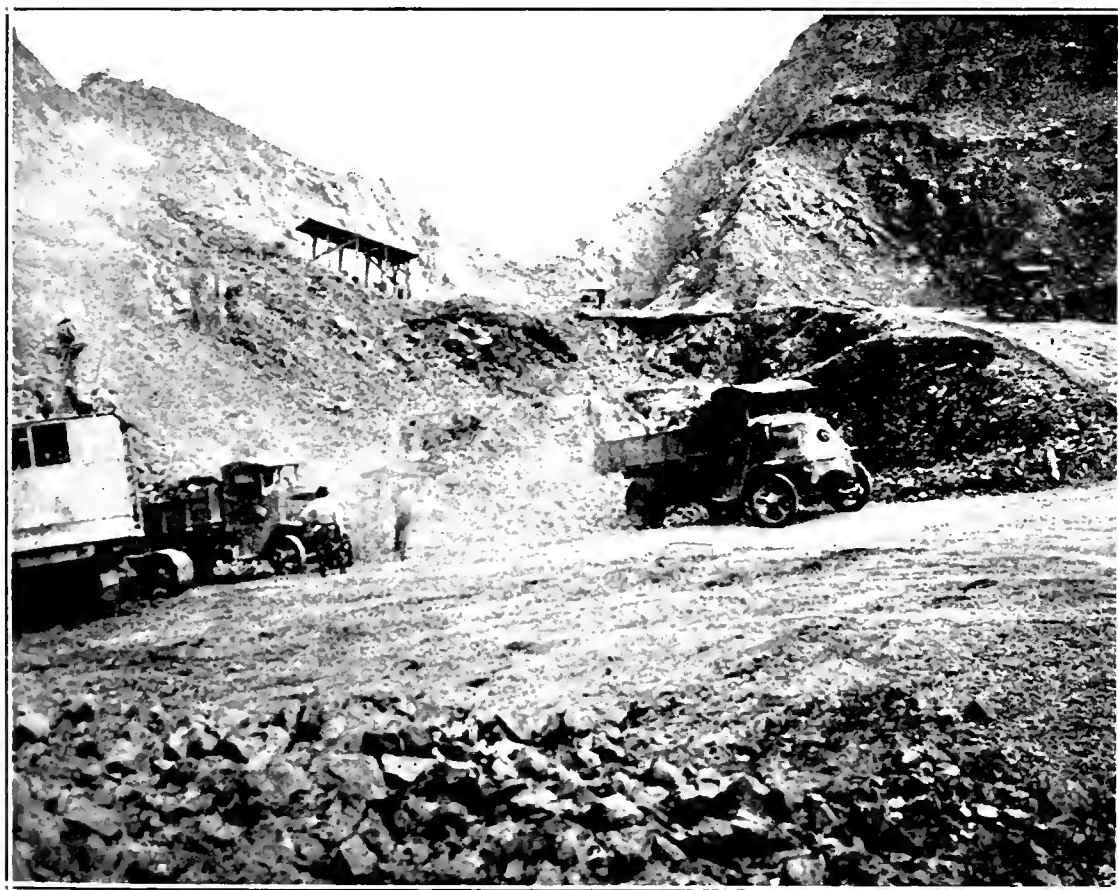
* Combined to conceal the output of a single operator in each.

^a U. S. Bureau of Mines, Mineral Market Report 218, Aug. 11, 1933.



Cast-iron condensers at Rinconada Quicksilver Mine, San Luis Obispo County.

Photo by Walter W. Bradley.



Open-cut and glory-hole at upper level of New Idria Quicksilver Mine, San Benito County.

Photo by Walter W. Bradley.

Prices.

During 1932 the average for New York monthly quotations¹ was \$57.925 per 76 pound flask. The average price for January was \$64.90 per flask, raising to \$72.125 per flask in March, the high monthly average for the year, then declining to \$47.444 per flask for August, the low for the year. Then improving slightly till December, which had an average of \$48.50 per flask. The average amount received by producers in California during 1932, according to reports received by the Division of Mines, was \$52.30 per 76 pound flask, compared with \$83.22 per flask in 1931; \$110.36 per flask in 1930 and \$117.78 per flask in 1929.

The U. S. Bureau of Mines² reported the total production of the United States for 1932 at 12,622 flasks valued at \$731,129. California was by a considerable margin the largest producing state with approximately 42% of the total, the other producing states being Oregon, Nevada, Texas, Washington, Arizona, Arkansas, and Alaska. The national production in 1931 was 24,947 flasks worth \$2,179,145.

During 1932 imports of quicksilver into the United States amounted to 8114 flasks valued at \$231,414, of which 4554 flasks came from Spain, and 3447 flasks from Italy. The 1932 imports showed an increase over those of 1931, which were 356 flasks worth \$32,649.

Total Quicksilver Production of California.

Total amount and value of the quicksilver production of California, as given in available records, are shown in the following tabulation. Though the New Almaden Mine in Santa Clara County was first worked in 1824, and has been in practically continuous operation since 1846 (the yield being small the first two years), there are no available data on the output earlier than 1850. Previous to June, 1904, a 'flask' of quicksilver contained 76½ pounds; then 75 pounds up to and including 1927; beginning with 1928, 76 pounds. In compiling this table the following sources of information were used: for 1850-1883, table by J. B. Randol, in Report of State Mineralogist IV, p. 336; 1883-1893, U. S. Geological Survey reports; 1894 to date, statistical bulletins of the State Mining Bureau; also State Mining Bureau, Bulletin 27, "Quicksilver Resources of California," 1908, p. 10.

¹ Engineering and Mining Journal, Vol. 133, 1932.

² U. S. Bureau of Mines Mineral Market Rept. 209, June 9, 1933.

Year	Flasks	Value	Average price per flask	Year	Flasks	Value	Average price per flask
1850	7,723	\$768,052	\$99 45	1893	30,164	\$1,108,527	\$36 75
1851	27,779	1,859,248	66 93	1894	30,416	934,000	30 70
1852	20,000	1,166,600	58 33	1895	36,104	1,337,131	37 04
1853	22,284	1,235,648	55 45	1896	30,765	1,075,449	34 96
1854	30,004	1,663,722	55 45	1897	26,691	993,445	37 28
1855	33,000	1,767,150	53 55	1898	31,092	1,188,626	38 23
1856	30,000	1,549,500	51 65	1899	29,454	1,405,045	47 70
1857	28,204	1,374,381	48 73	1900	26,317	1,182,786	44 94
1858	31,000	1,482,730	47 83	1901	26,720	1,285,014	48 46
1859	13,000	820,690	63 13	1902	29,552	1,276,524	43 20
1860	10,000	535,500	53 55	1903	32,094	1,335,954	42 25
1861	35,000	1,471,750	42 05	1904	^a 28,876	1,086,323	37 62
1862	42,000	1,526,700	36 35	1905	24,655	886,081	35 94
1863	40,531	1,705,544	42 08	1906	19,516	712,334	36 50
1864	47,489	2,179,745	45 90	1907	17,379	663,178	38 16
1865	53,000	2,432,700	45 90	1908	19,039	763,520	42 33
1866	46,550	2,473,202	53 13	1909	16,217	773,788	47 71
1867	47,000	2,157,300	45 90	1910	17,665	799,002	45 23
1868	47,728	2,190,715	45 90	1911	19,109	879,205	46 01
1869	33,811	1,551,925	45 90	1912	20,600	866,024	42 04
1870	30,077	1,725,818	57 38	1913	15,661	630,042	40 23
1871	31,686	1,999,387	63 10	1914	11,373	557,846	49 05
1872	31,621	2,084,773	65 93	1915	14,199	1,157,449	81 52
1873	27,642	2,220,482	80 33	1916	21,427	2,003,425	93 50
1874	27,756	2,919,376	105 18	1917	24,382	2,396,466	98 29
1875	50,250	4,228,538	84 15	1918	22,621	2,579,472	114 03
1876	75,074	3,303,256	44 00	1919	15,200	1,353,381	89 04
1877	79,396	2,961,471	37 30	1920	10,278	775,527	75 45
1878	63,880	2,101,652	32 90	1921	3,157	140,666	44 56
1879	73,684	2,194,674	29 85	1922	3,466	191,851	55 35
1880	59,926	1,857,706	31 00	1923	5,458	332,851	60 98
1881	60,851	1,815,185	29 83	1924	7,948	543,080	68 33
1882	52,732	1,488,624	28 23	1925	7,683	621,831	80 81
1883	46,725	1,343,344	28 75	1926	5,892	516,382	87 64
1884	31,913	973,347	30 50	1927	6,488	714,418	111 67
1885	32,073	986,245	30 75	1928	^b 7,107	844,649	118 84
1886	29,981	1,064,326	35 50	1929	10,152	1,195,705	117 78
1887	33,760	1,430,749	42 38	1930	11,374	1,255,257	110 36
1888	33,250	1,413,125	42 50	1931	13,478	1,121,624	83 22
1889	26,464	1,190,880	45 00	1932	5,349	279,780	52 30
1890	22,926	1,203,615	52 50				
1891	22,904	1,036,406	45 25				
1892	27,993	1,139,595	40 71				
				Totals	2,273,379	\$114,458,934	

^a Flasks of 75 lbs. since June, 1904; of 76½ lbs. previously.

^b Flasks of 76 pounds, from January, 1928.

SILVER

Bibliography: State Mineralogist Reports IV, VIII, XII-XXVII (inc.). Bulletins 67, 91. Min. & Sci. Press, March 1, 1919.

The 1932 silver production in California totaled 493,533 fine ounces valued at \$139,176, as compared with the 1931 output of 867,818 fine ounces worth \$251,667. Of the 1932 output there were 16,600 fine ounces worth \$4,681, from placers. The average price of domestic silver was 28.2¢ per fine ounce in 1932 and the lowest yearly average on record, compared with 29¢ per ounce in 1931, 38.5¢ per ounce in 1930, and 53.3¢ per ounce in 1929.

Distribution of the 1932 silver production by counties was as follows:

<i>County</i>	<i>Fine ounces</i>	<i>Value</i>
Alameda	49	\$14
Alpine	854	241
Amador	13,706	3,865
Butte	2,543	717
Calaveras	2,706	763
Colusa	4	1
Del Norte	8	2
El Dorado	1,534	438
Fresno	114	32
Humboldt	15	4
Imperial	530	149
Inyo	85,478	24,105
Kern	14,033	3,957
Lassen	12	3
Los Angeles	47	13
Madera	184	52
Mariposa	2,254	636
Merced	1,861	525
Modoc	102	29
Mono	18,767	5,292
Monterey	4	1
Nevada	105,916	29,868
Placer	1,006	284
Plumas	29,008	8,180
Riverside	450	127
Sacramento	3,972	1,120
San Bernardino	178,161	50,241
San Diego	112	32
San Joaquin	6	2
San Luis Obispo	3	1
Shasta	14,088	3,973
Sierra	8,041	2,268
Siskiyou	1,078	304
Stanislaus	688	194
Trinity	2,155	608
Tulare	4	1
Tuolumne	758	214
Ventura	16	5
Yuba	3,244	915
Totals	493,533	\$139,176

The following paragraphs are quoted from the United States Bureau of Mines, Department of Commerce, Advanced Chapter on Gold and Silver for 1932 by courtesy of Mr. V. C. Heikes and Mr. Charles White Merrill, statisticians in charge of the San Francisco Branch office:

"The mine production of silver in California in 1932 was 493,533 fine ounces, valued at \$139,176, a decrease of 374,285 ounces in quantity and \$112,491 in value compared with 1931. Only one property produced more than 100,000 ounces, one between 50,000 and 100,000 ounces, five between 20,000 and 50,000 ounces, and 20 between 1000 and 20,000 ounces each. The chief silver-producing counties in 1932 were San Bernardino and Nevada, each with an output of between 100,000 and 200,000 ounces, followed by Inyo and Plumas, with outputs between 25,000 and 100,000 ounces each. Of the total silver output from lode mines gold ore, old tailings and mill cleanings yielded 180,703 ounces or 38 per cent, dry silver ore, 179,962 ounces or 38 per cent, lead ore, 86,766 ounces or 18 per cent, and copper ore and pyrites, 28,726 ounces or 6 per cent. A small quantity of silver was derived from gold-silver ore. The yield of silver from placer mines was 16,600 ounces, valued at \$4,681. In California in 1932, 28 properties (lode and placer) produced 93 per cent of the total silver."

"The output of silver was the smallest since 1896. The mines in the Randsburg district produced most of the silver in 1932, followed by the production from ores in the Cerro Gordo district in Inyo County, and a by-product of certain gold ores in the Grass Valley region."

Silver Production of California, by Years.

The amount and value of the silver production of California, and the average price, annually, since 1880 are given in the table following. In the table shown in the statistical bulletins previous to Bulletin 97 (for 1925), the values shown for 1880-1904 (inc.) were taken from the reports of the Director of the Mint, of which the figures for 1880-1896

(inc.) were based on 'coinage value' (\$1.2929 per fine ounce). We have recalculated these to commercial value, using the price table of the U. S. Geological Survey (McCaskey, H. D., Gold and Silver, 1913: Mineral Resources of the U. S., Part I, p. 847). From 1905 to date, the figures are those of the U. S. Geological Survey and its successor, the U. S. Bureau of Mines.

Silver Production of California, by Years, Since 1880

Year	Fine oz.	Value	Average price per oz.	Year	Fine oz.	Value	Average price per oz.
1880.....	882,169	\$1,014,494	\$1 15	1908.....	1,647,278	\$873,057	\$0 53
1881.....	580,091	655,503	1 13	1909.....	2,098,253	1,091,092	52
1882.....	653,569	745,069	1 14	1910.....	1,840,085	993,646	54
1883.....	1,129,244	1,253,461	1 11	1911.....	1,270,445	673,336	53
1884.....	3,236,987	3,593,056	1 11	1912.....	1,300,136	799,584	615
1885.....	1,986,260	2,125,298	1 07	1913.....	1,378,399	832,553	604
1886.....	1,245,747	1,233,290	0 99	1914.....	1,471,859	813,938	553
1887.....	1,262,282	1,237,036	0 98	1915.....	1,678,756	851,129	507
1888.....	1,314,874	1,235,982	0 94	1916.....	2,564,354	1,687,345	658
1889.....	823,947	774,510	0 94	1917.....	1,775,431	1,462,955	824
1890.....	820,336	861,353	1 05	1918.....	1,427,711	1,427,711	1 00
1891.....	737,224	729,852	0 99	1919.....	1,107,189	1,240,051	1 12
1892.....	358,575	311,960	87	1920.....	1,706,327	1,859,896	1 09
1893.....	415,468	324,065	78	1921.....	3,629,223	3,629,223	1 00
1894.....	229,896	144,834	63	1922.....	3,100,065	3,100,065	1 00
1895.....	463,911	501,542	65	1923.....	3,559,443	2,918,743	82
1896.....	326,757	222,195	68	1924.....	3,555,133	2,381,952	67
1897.....	754,648	452,789	60	1925.....	3,054,416	2,119,765	694
1898.....	701,788	414,055	59	1926.....	2,022,460	1,262,015	624
1899.....	855,869	513,521	60	1927.....	1,620,242	918,677	567
1900.....	1,168,157	724,257	62	1928.....	1,478,771	865,081	585
1901.....	950,831	570,499	60	1929.....	1,176,895	627,285	533
1902.....	1,163,041	616,412	53	1930.....	1,622,803	624,779	385
1903.....	958,230	517,444	54	1931.....	867,818	251,667	290
1904.....	1,441,259	835,929	58	1932.....	493,533	139,176	282
1905.....	1,076,174	650,009	61				
1906.....	1,220,641	817,830	68				
1907.....	1,138,856	751,646	66				
				Totals.....	75,343,856	\$57,072,612	

TIN

Bibliography: Reports XV, XVII, XVIII, XXV. Bulletins 67, 91.

In 1928 and 1929 there was a small amount of tin produced from Californian ore as well as considerable development work which was done at the Temescal mine in Riverside County near Corona. There was an output from the district during 1891-1892 as tabulated below. Small quantities of stream tin have been found in some of the placer workings in northern California, but never in paying amounts.

Two occurrences have also been noted, in northern San Diego County. Crystals of cassiterite were found there, associated with blue tourmaline crystals, amblygonite and beryl. No commercial quantity has been developed, only small pockets have been taken out.

Total Output of Tin in California

Year	Pounds	Value
1891.....	125,289	\$27,564
1892.....	126,000	32,400
1928}	*	*
1929}		
Totals.....	251,289	\$59,964

* Annual details concealed under 'Unapportioned.'

TITANIUM

Bibliography: State Mineralogist's Report XXIII.

During 1932 there was no production of titanium ores reported in California. In 1927 the first recorded shipments of titanium minerals were made in California. The total of the 1927 and 1928 production was 10,013 tons valued at \$150,195. All of this came from Los Angeles County and was produced from either the beach black sands which contained approximately 20% titaniferous iron and magnetite, the gangue being silica and several silicates, or from a lode deposit in the San Gabriel Mountains.

The market price of titanium minerals varies as to the titanium oxide it contains. Rutile 94% TiO at 10¢ a pound, ilmenite 45 to 52% TiO at \$10 to \$12 a ton, and ilmenite 32 to 35% TiO at \$7 to \$8 a ton, all prices Atlantic seaboard.

TUNGSTEN

Bibliography: Reports XV, XVII, XVIII, XXII, XXIV, XXVII (inc.). Bulletins 38, 67, 91, 95. U. S. G. S., Bull. 652. Proc. Colo. Sci. Soc., Vol. XI. South Dakota School of Mines, Bulletin No. 12. Eng. and Min. Jour.-Press, Vol. 113, pp. 666-669, Apr. 22, 1922.

The commercial production of tungsten ores and concentrates in California began in 1905; and has been continuous since, with the exception of 1920-1922 (inclusive). The material shipped in 1932 was high-grade sorted ore and concentrates, coming from a single property each in El Dorado and Tulare counties. Some of the material was mined in 1931. The annual details are concealed under 'Unapportioned' item to conceal the output of either operator.

Quotations in "Metal and Minerals Markets" during 1932 ranged from \$9.50 to \$11 per unit WO_3 for Chinese wolframite, duty paid; \$9 to \$10.75 per unit WO_3 for Bolivian scheelite, duty paid; from \$7.50 to \$11.75 per unit WO_3 for domestic scheelite. The higher prices were received in the early part of the year. Present prices per unit WO_3 at New York are: Chinese wolframite, duty paid, \$14; Bolivian scheelite, \$14; domestic scheelite, \$14.

Imports of foreign tungsten ores and alloys into the United States during 1932, according to the U. S. Bureau of Foreign and Domestic Commerce, was 191,816 pounds valued at \$19,365, compared with 2,111,298 pounds worth \$246,201 in 1931. The Tariff Act of 1930 raised the duty on tungsten ore or concentrates to 50 cents per pound on the metallic tungsten contained therein. Duties are also provided for imported tungsten-bearing alloys.

Tungsten ore has been produced in California principally in the Atolia-Randsburg district in San Bernardino and Kern counties, followed by the Bishop district in Inyo County, with small amounts coming from Nevada County and from the district near Goffs, in eastern San Bernardino. Most of California's tungsten ore is scheelite (calcium tungstate), though wolframite (iron-manganese tungstate) and hüberrite (manganese tungstate) also occur. The deposits at Atolia are the largest and most productive scheelite deposits known.

Total Tungsten Ore Production of California.

The annual amount and value of tungsten ores and concentrates produced in California since the inception of the industry is given herewith, with tonnages recalculated to 60% WO_3 :

Year	Tons at 60% WO_3	Value	Year	Tons at 60% WO_3	Value
1905.....	57	\$18,800	1919.....	214	\$219,316
1906.....	485	189,100	1920.....		
1907.....	287	120,587	1923.....	34	19,126
1908.....	105	37,750	1924.....	781	446,009
1909.....	577	190,500	1925.....	573	348,475
1910.....	457	208,245	1926.....	441	316,560
1911.....	387	127,706	1927.....		
1912.....	572	206,000	1928.....	398	429,237
1913.....	559	234,673	1929.....	150	106,280
1914.....	420	180,575	1930.....	120	82,582
1915.....	962	1,005,467	1931.....	*	*
1916.....	2,270	4,571,521	1932.....	*	*
1917.....	2,466	3,079,013			
1918.....	1,982	2,832,222	Totals.....	14,297	\$14,969,740

* Annual details concealed under 'Unapportioned.'

VANADIUM

Bibliography: Reports XV, XXVI. Bulletins 67, 91. Proc. Colo. Sci. Soc., Vol. XI. U. S. Bur. of Mines, Bulletin 104.

No commercial production of vanadium has yet been made in California. Occurrences of this metal have been found at Camp Signal, near Goffs, in San Bernardino County, and two companies at one time did considerable development work in the endeavor to open up paying quantities. Some ore carrying lead vanadate has been developed in the 29 Palms, or Washington district, on the line between Riverside and San Bernardino counties, but no shipments reported.

Present New York quotations for ferrovanadium are \$2.60-\$2.80 per pound of vanadium f.o.b. works, and vanadium ore 26¢ per pound V_2O_5 contained.

ZINC

Bibliography: State Mineralogist Reports XIV, XV, XVII, XVIII, XX-XXIV, XXVI, XXVII. Bulletins 38, 67, 91.

There was no zinc ore reported shipped during 1932 in California.

The zinc ores of Shasta and Calaveras counties are associated with copper, while those of Inyo, Los Angeles and San Bernardino are associated principally with lead-silver and zinc-silver ores.

The production of metallic zinc¹ at reduction plants in the United States during 1932 amounted to 221,866 short tons valued at \$13,312,000, also 14,718 tons of redistilled secondary metal. The 1932 output was a decrease from that of 1931, which was 313,621 tons.

The average price per pound quoted for zinc in 1932 was 3.0¢ compared with 3.8¢ in 1931, 4.8¢ in 1930, and 6.5¢ in 1929.

¹ U. S. Bureau of Mines, Mineral Market Report 184, March 8, 1933.

Total Zinc Production of California.

Total figures for zinc output of the state are as follows, commercial production dating back only to 1906:

Year	Pounds	Value	Year	Pounds	Value
1906.....	206,000	\$12,566	1920.....	1,188,009	\$96,229
1907.....	177,759	10,598	1921.....	846,184	42,309
1908.....	54,000	3,544	1922.....	3,034,430	172,963
1909.....			1923.....		
1910.....			1924.....	3,060,000	198,900
1911.....	2,679,842	152,751	1925.....	11,546,602	877,542
1912.....	4,331,391	298,866	1926.....	20,447,559	1,533,568
1913.....	1,157,947	64,845	1927.....	8,625,004	552,000
1914.....	399,641	20,381	1928.....		
1915.....	13,043,411	1,617,383	1929.....		
1916.....	15,950,565	2,137,375	1931.....	149,865	5,314
1917.....	11,854,804	1,209,190	1932.....		
1918.....	5,565,516	506,466			
1919.....	1,384,192	101,046	Totals.....	105,702,769	\$9,613,836

CHAPTER FOUR

STRUCTURAL MATERIALS

Bibliography: State Mineralogist Reports XII–XXVIII (inc.). Bulletin 38. Spurr and Wormser, "Marketing of Metals and Minerals." "Non-Metallic Minerals," by R. B. Ladoo. See also under each substance.

As indicated by this subdivision heading, the mineral substances herein considered are those more or less directly used in building and structural work. California is independent, so far as these are concerned, and almost any reasonable construction can be made with materials produced in the state.

This branch of the mineral industry for 1932 was valued at \$17,676,445, as compared with a total value of \$27,303,449 for the year 1931, the decrease being mainly due to miscellaneous stone, cement, brick and hollow building tile, though all other materials in this group, with the exception of bituminous rock, showed decreases in both amount and total value.

In 1932 all counties, with the exception of Kings and Sutter, contributed to this structural total. There is not a county in the fifty-eight counties of the state which is not capable of producing at least one of the materials under the classification and in 1926 every county contributed one or more substances to the group.

The following summary shows the value of the structural materials produced in California during the years 1931–1932, with increases or decreases in each instance:

Substance	1931		1932		Increase+ Decrease— Value
	Amount	Value	Amount	Value	
Brick and hollow building tile.....		\$2,560,415		\$1,605,086	\$955,329—
Cement.....	7,693,712 bbls.	11,510,655	5,657,549 bbls.	7,967,107	3,543,548—
Chromite.....	441 tons	6,737	(*)	(*)	(*)—
Granite.....		636,741		398,676	238,065—
Lime.....	36,189 tons	360,523	27,510 tons	254,223	106,300—
Magnesite.....	21,576 tons	182,283	(*)	(*)	(*)—
Marble ^a		81,760		42,505	39,255—
Sandstone.....		30,960		13,286	17,674—
Stone, miscellaneous.....		11,848,531		7,183,643	4,664,888—
Unapportioned.....		84,844		^c 212,919	128,075+
Total values.....		\$27,303,449		\$17,677,445	
Net decrease.....					\$9,626,004—

^aIncluded under 'Unapportioned.'

^bIncludes onyx and travertine.

^cIncludes bituminous rock, slate, paving block and tube-mill pebbles.

^dIncludes bituminous rock, chromite, magnesite, slate and tube-mill pebbles.

ASPHALT

Bibliography: State Mineralogist Reports VII, X, XII–XV (inc.), XVII, XVIII. Bulletins 16, 32, 63, 67, 69, 91.

Asphalt was for a number of years accounted for in the statistical reports by the State Mining Bureau, because in the early days of the oil industry, considerable asphalt was produced from outcroppings of oil sand, and was a separate industry from the production of oil itself. However, at the present time most of the asphalt comes from the oil refineries, which produce a better and more uniform grade; hence, its value is not now included in the mineral total, as to do so would be in part a duplication of the crude petroleum figures. Such natural asphalt as is at present mined is in the form of bituminous sandstones, and is recorded under that designation.

BITUMINOUS ROCK

Bibliography: State Mineralogist Reports XII, XIII, XV, XVII, XVIII, XXI, XXII, XXV, XXVI.

This material is essentially an uncemented sandstone which is saturated with and held together by a natural asphaltic constituent, probably the residue from the evaporation of a crude petroleum deposit. Bituminous rock is still used to a limited extent for road dressing in those districts adjacent to available deposits, though the manufacture of asphalt at the oil refineries has almost entirely superseded the direct use of the native material. Some of the Santa Cruz County production is put on the market as a material which can be laid cold. This material is especially applicable and valuable for patch jobs.

During 1932 shipments of bituminous rock were made from Santa Barbara and Santa Cruz counties with a single producer in each. The annual details are concealed under the 'Unapportioned' item so as not to reveal the output of either operator. The total of the 1931 and 1932 yields was 23,653 tons worth \$109,140, with 1932 showing a slight increase in quantity and a slight decrease in value over 1931, although either year was well over the 1930 figures, which were 8525 tons and \$36,075.

Bituminous Rock Production of California, by Years.

The following tabulation shows the total amount and value of bituminous rock quarried and sold in California, from the records compiled by the State Mining Bureau, annually since 1887:

Year	Tons	Value	Year	Tons	Value
1887.....	36,000	\$160,000	1911.....	75,125	\$117,279
1888.....	50,000	257,000	1912.....	44,073	87,467
1889.....	40,000	170,000	1913.....	37,541	78,479
1890.....	40,000	170,000	1914.....	66,119	166,618
1891.....	39,962	154,164	1915.....	17,789	61,468
1892.....	24,000	72,000	1916.....	19,449	66,561
1893.....	32,000	192,036	1917.....	5,590	18,580
1894.....	31,214	115,193	1918.....	2,561	9,067
1895.....	38,921	121,586	1919.....	4,614	18,537
1896.....	49,456	122,500	1920.....	5,450	27,825
1897.....	45,470	128,173	1921.....	8,298	43,192
1898.....	46,836	137,575	1922.....	4,624	13,570
1899.....	40,321	116,097	1923.....	2,945	11,780
1900.....	25,306	71,495	1924.....	6,040	14,922
1901.....	24,052	66,354	1925.....	2,681	10,724
1902.....	33,490	43,411	1926.....	3,863	21,577
1903.....	21,944	53,106	1927.....	3,515	17,704
1904.....	45,280	175,680	1928.....	4,966	33,832
1905.....	24,753	60,436	1929.....	3,320	14,360
1906.....	16,077	45,204	1930.....	8,525	36,075
1907.....	24,122	72,835	1931.....	*	*
1908.....	30,718	109,818	1932.....	23,653	109,140
1909.....	34,123	116,436			
1910.....	87,547	165,711	Totals.....	1,232,333	\$3,875,557

* Annual details concealed under 'Unapportioned.'

BRICK AND HOLLOW TILE

Bibliography: State Mineralogist Reports VIII, X, XII–XV (inc.), XVII–XXVII (inc.). Bulletins 38, 99. Preliminary Report No. 7. Cal. Jour. of Development, June, 1925, pp. 5–6.

Bricks of many varieties and in important quantities are annually produced in California, as might be expected in a state with such diversified and widespread mineral resources. The varieties include common, fire, pressed, glazed, enamel, fancy, vitrified, sand-lime, and others. Not only do the plants here supply practically all of our own requirements in these products, but considerable quantities are shipped to contiguous territory and certain products are shipped over a much wider radius.

We also include under this heading the various forms of hollow building 'tile' or blocks. The application of this tile to residence construction as well as to other structures has grown, although their total output for 1932 showed a decrease in value and tonnage as compared with the 1931 production.

The value of the 1932 output of all kinds of brick showed a decrease in their total values of about 35 per cent and in amount about 40 per cent. It came from fifty-three plants in twenty counties. The 1932 production consisted of 75,355 M of common brick, valued at \$674,325; 10,543 M of fire brick valued at \$526,242; 4785 M of glazed, pressed, fancy, vitrified, paving, etc., valued at \$180,199; and 27,098 tons of hollow building tile valued at \$224,320, which gave a total value for the year for brick and hollow building tile of \$1,605,086, as compared with the 1931 output, which had a total value of \$2,560,415.

Los Angeles County had the largest output with twenty-one plants, which made 51,241 M of common brick, 4422 M of fire brick, and 2436 M of glazed, pressed, fancy brick, etc., having a value of \$747,301, and 6927 tons of hollow building tile worth \$54,740. In the other counties, Alameda had five operating plants, making a total production worth \$161,001; the output value of Santa Clara, with four plants, was \$25,281; three plants in Sacramento produced \$85,187; there were two plants each in Kern, Orange, Riverside, San Diego, and San Joaquin; and one each in Amador, Contra Costa, Fresno, Humboldt, Marin, Placer, San Bernardino, Santa Barbara, Tehama, Tulare, and Ventura.

Brick and Hollow Tile Production of California, by Years.

Record of brick production in the state has been kept since 1893 by this Bureau, the figures for hollow building 'tile' or blocks being also included since 1914. The annual and total figures, for amount and value, are given in the following table:

Year	Brick, M	Hollow building blocks, tons	Value
1893	103,900	-----	\$801,750
1894	81,675	-----	457,125
1895	131,772	-----	672,360
1896	24,000	-----	524,740
1897	97,468	-----	563,240
1898	100,102	-----	571,362
1899	125,950	-----	754,730
1900	137,191	-----	905,210
1901	130,766	-----	860,488
1902	169,851	-----	1,306,215
1903	214,403	-----	1,999,546
1904	281,750	-----	1,994,740
1905	286,618	-----	2,273,786
1906	277,762	-----	2,538,848
1907	362,167	-----	3,438,951
1908	332,872	-----	2,506,495
1909	333,846	-----	3,059,929
1910	340,883	-----	2,934,731
1911	327,474	-----	2,638,121
1912	337,233	-----	2,940,290
1913	358,754	-----	2,915,350
1914	270,791	-----	2,288,227
1915	180,538	-----	1,678,756
1916	206,960	-----	2,096,570
1917	192,269	29,348	2,532,721
1918	136,374	34,818	2,363,481
1919	156,328	36,026	3,087,067
1920	245,842	99,208	5,704,393
1921	238,022	67,100	5,570,875
1922	374,853	105,909	7,994,991
1923	397,754	122,534	9,738,082
1924	456,716	114,469	9,137,908
1925	361,094	105,491	7,503,976
1926	388,048	90,332	7,026,124
1927	374,111	75,116	6,516,077
1928	272,443	66,277	5,694,770
1929	327,011	66,713	5,607,410
1930	267,019	68,047	4,205,460
1931	151,545	51,988	2,560,415
1932	90,683	27,098	1,605,086
Totals	9,644,838	1,160,474	\$129,570,396

CEMENT

Bibliography: State Mineralogist Reports VIII, IX, XII, XIV, XV, XVII, XVIII, XXI-XXVII (inc.). Bulletin 38.

Cement is the most important single structural material in the mineral output of California.

During 1932 there was a production of 5,657,549 barrels of cement valued at \$7,967,107 f.o.b., being a decrease in both quantity and value

from that of the previous year. The 1931 output was 7,693,712 barrels worth \$11,510,655 or an average value of \$1.49 per barrel. The average value per barrel in 1932 was \$1.40.

During 1932 shipments were made from eleven plants in nine counties to the extent of 5,853,155 barrels worth \$8,202,038. These plants employed 1172 men. Two plants were operating and another making shipments from stock in San Bernardino County on hand and a single operating plant in each of the following counties: Calaveras, Contra Costa, Kern, Los Angeles,¹ Merced, Riverside, San Mateo and Santa Cruz.

Cement Production of California, by Years.

'Portland' cement was first commercially produced in California in 1891; though in 1860 and for several years following, a natural hydraulic cement from Benicia was utilized in building operations in San Francisco.

"The Benicia Cement Company in 1859-60 was turning out 50 to 100 barrels of cement a day and San Francisco was using about 12,000 barrels a year. The mill price of the product was then \$4 a barrel. By 1865, the San Francisco rate of consumption had increased to 100,000 barrels yearly, brick buildings largely taking the place of frame structures, and the price of cement had fallen to \$2.50 a barrel, about the same as it is today."²

The growth of the industry became rapid after 1902; since which time cement has continued to be an important factor in the industrial life of the state. Although the total cement figures, to date, are not of the same magnitude as those for gold and petroleum, it is interesting to note that the value of California's cement yield in the period 1920-1931 annually exceeded the value of her gold output.

Cement Production of California, by Years

Year	Barrels	Value	Year	Barrels	Value
1891.....	5,000	\$15,000	1913.....	6,167,806	\$7,743,024
1892.....	5,000	15,000	1914.....	5,109,218	6,558,148
1893.....			1915.....	4,918,275	6,044,950
1894.....	8,000	21,600	1916.....	5,299,507	6,210,293
1895.....	16,383	32,556	1917.....	5,790,734	7,544,282
1896.....	9,500	28,250	1918.....	4,772,921	7,969,909
1897.....	18,000	66,000	1919.....	4,645,289	8,591,990
1898.....	50,000	150,000	1920.....	6,709,160	14,962,945
1899.....	60,000	180,000	1921.....	7,404,221	18,072,120
1900.....	52,000	121,000	1922.....	8,962,135	16,524,056
1901.....	71,800	159,842	1923.....	10,825,405	25,999,203
1902.....	171,000	423,600	1924.....	11,655,131	23,225,850
1903.....	640,868	968,727	1925.....	13,206,630	25,043,335
1904.....	969,538	1,539,807	1926.....	13,797,173	25,269,678
1905.....	1,265,553	1,791,916	1927.....	14,661,783	26,474,935
1906.....	1,286,000	1,941,250	1928.....	13,625,231	24,463,287
1907.....	1,613,563	2,535,577	1929.....	12,794,729	21,038,565
1908.....	1,629,615	2,359,692	1930.....	9,831,938	14,575,731
1909.....	3,779,205	4,969,437	1931.....	7,693,712	11,510,655
1910.....	5,453,193	7,485,715	1932.....	5,657,549	7,967,107
1911.....	6,371,369	9,085,625			
1912.....	6,198,634	6,074,661	Totals.....	203,202,768	\$345,805,308

¹ The plant in Los Angeles County grinds clinker coming from San Bernardino County, therefore the crude material is credited to the latter.

² Monthly Review of Mercantile Trust Co. of Cal., Vol. XIII, No. 3, p. 55, Mar., 1924.

CHROMITE

Bibliography: State Mineralogist Reports IV, XII, XIII, XIV, XV, XVII, XVIII, XXI-XXVII (inc.). Bulletins 38, 76, 91. Preliminary Report 3. U. S. G. S., Bull. 430. Min. & Sci. Press, Vol. 114, p. 552.

During the year 1932 there was one shipper of chromic-iron ore or chromite in California. This material was mined prior to 1932 and came from Tuolumne County. The annual details are concealed under the 'Unapportioned' item. Shipments for 1932 showed a decrease from those of 1931, which were 441 tons of ore running 45% Cr_2O_3 valued at \$6,737 f.o.b. rail-shipping point.

Occurrence.

Chromite is widely distributed in California, the principal production, thus far, having come from El Dorado, San Luis Obispo, Del Norte, Shasta, Siskiyou, Placer, Fresno, and Tuolumne counties. In 1918 a total of 29 counties contributed to the state's output. There are two main belts in California yielding this mineral, one along the Coast Ranges from San Luis Obispo County to the Oregon line, including the Klamath Mountains at the north end, and the other in the Sierra Nevada from Tulare County to Plumas County. Chromite occurs as lenses in basic igneous rocks such as peridotite and pyroxenite, and in serpentines which have been derived by alteration of such basic rocks.

Imports.

Imports of foreign chromite¹ duty free, mainly from Rhodesia, New Caledonia and India, totaled 89,143 long tons valued at \$1,625,733 for the year 1932, compared with 212,528 tons worth \$3,314,796 in 1931.

Total Chromite Production of California.

Production of chromite in California began, apparently, about 1874, principally in San Luis Obispo County. There was considerable activity from 1880 to 1883, inclusive, and a total of 23,238 long tons (or 26,028 short tons), valued at \$329,924, was shipped from that county up to the beginning of 1887. Some ore also was shipped from the Tyson properties in Del Norte County. The tabulation herewith shows the output of chromite in California, annually, including the earliest figures so far as they are available. The figures from 1887 to date are from the records of the State Mining Bureau:

¹ Monthly Summary of Foreign Commerce of U. S. Bureau of Foreign and Domestic Commerce, Part 1, Dec., 1932.

Total Chromite Production of California

Year	Tons	Value	Year	Tons	Value
1874-1876 (San Luis Obispo County).....	26,028	\$329,924	1910.....	749	\$9,707
1887.....	3,000	40,000	1911.....	935	14,197
1888.....	1,500	20,000	1912.....	1,270	11,260
1889.....	2,000	30,000	1913.....	1,180	12,700
1890.....	3,599	53,985	1914.....	1,517	9,434
1891.....	1,372	20,580	1915.....	3,725	38,044
1892.....	1,500	22,500	1916.....	48,943	717,244
1893.....	3,319	49,785	1917.....	52,379	1,130,298
1894.....	3,680	39,980	1918.....	73,955	3,649,497
1895.....	1,740	16,795	1919.....	*4,314	97,164
1896.....	786	7,775	1920.....	1,770	43,031
1897.....			1921.....	347	6,870
1898.....			1922.....	379	6,334
1899.....			1923.....	84	1,658
1900.....	140	1,400	1924.....	350	6,700
1901.....	130	1,950	1925.....	191	3,712
1902.....	315	4,725	1926.....	393	7,063
1903.....	150	2,250	1927.....	225	5,063
1904.....	123	1,845	1928.....	729	15,179
1905.....	40	600	1929.....	327	5,025
1906.....	317	2,859	1930.....	84	1,905
1907.....	302	6,040	1931.....	441	6,737
1908.....	350	6,195	1932.....	a	a
1909.....	436	5,309	Totals.....	245,116	\$6,463,869

* Recalculated to 45% Cr₂O₃, beginning with 1919.

^a Annual details concealed under 'Unapportioned.'

GRANITE

Bibliography: State Mineralogist Reports X, XII-XXVI (inc.). Bulletin 38.

The 1932 output of granite consisted of 248,270 cu. ft. of building stone valued at \$270,542; 58,495 cu. ft. of monumental stone valued at \$121,898; 3800 linear ft. of curbing valued at \$5,400; and 1150 cu. ft. unclassified material, which included a small amount of tuff and some flow volcanic rock, to be used as building stone and flagstone, having a value of \$836; giving a total value for the year of \$398,675. This was a decrease from the 1931 total, which was \$636,741. The 1932 material came from twenty quarries in ten counties, seven of which were in San Diego, three in Placer, two each in Fresno and Tulare; and one each in Madera, Mariposa, Nevada, Plumas, Sonoma and Ventura.

So far as possible, granite production has been segregated in the statement herewith into the various uses to which the product was put. It will be noted, however, that a portion of the output has been entered under the heading 'Unclassified.' This is necessary because of the fact that some of the producers have no way of telling to what specific use their stone was put after they had quarried and sold the same in the rough.

Varieties.

For building purposes, the granites found in California, particularly the varieties from Raymond in Madera County, Rocklin in Placer County, and near Porterville in Tulare County, are unexcelled by any similar stone found elsewhere. The quantities available, notably at Raymond and Porterville, are unlimited. Most of California's 'granite,' particularly that found in the Sierra Nevada Mountains, is technically 'granodiorite' (that is, both plagioclase and orthoclase feldspars are present).

Granites of excellent quality for building and ornamental purposes are also quarried in Riverside and San Diego counties. Near Lakeside, San Diego County, there is a fine-grained, 'silver gray' granite of uniform texture and color, especially suited for monumental and ornamental work.

The Fresno County stone is a dark, hornblende diorite, locally called 'black granite,' whose color permits of a fine contrast of polished and unpolished surfaces, making it particularly suitable for monumental and decorative purposes. There is also a similar 'black granite' in Tulare County, near Success.

Granite Production of California, by Years.

The value of granite produced, annually, since 1887 has been as follows:

Year	Value	Year	Value
1887.....	\$150,000	1911.....	\$355,742
1888.....	57,000	1912.....	362,975
1889.....	1,329,018	1913.....	981,277
1890.....	1,200,000	1914.....	628,786
1891.....	1,300,000	1915.....	227,928
1892.....	1,000,000	1916.....	535,339
1893.....	531,322	1917.....	221,997
1894.....	228,816	1918.....	139,861
1895.....	224,329	1919.....	220,743
1896.....	201,004	1920.....	495,732
1897.....	188,024	1921.....	725,901
1898.....	147,732	1922.....	676,643
1899.....	141,070	1923.....	760,081
1900.....	295,772	1924.....	1,211,046
1901.....	519,285	1925.....	1,853,859
1902.....	255,239	1926.....	655,332
1903.....	678,670	1927.....	1,398,143
1904.....	467,472	1928.....	763,996
1905.....	353,837	1929.....	1,169,271
1906.....	344,083	1930.....	855,477
1907.....	373,376	1931.....	636,741
1908.....	512,923	1932.....	398,676
1909.....	376,834		
1910.....	417,898	Totals.....	\$26,569,550

LIME

Bibliography: Reports XIV, XV, XVII-XXVII (inc.). Bulletin 38.

In California during 1932 there was an output of lime to the amount of 27,510 short tons valued at \$254,223, coming from two plants each in El Dorado, San Bernardino, and Santa Cruz counties, and one each in Alameda, Tulare, and Tuolumne counties. The above figures showed a decline in both quantity and value from those of 1931, which were 36,189 tons worth \$360,523.

So far as we have been able to segregate the data, these figures include mainly only such lime as is used in building operations; though they do include a small proportion of calcined lime employed in agriculture and the chemical industries, the figures for which were not separable. A portion is hydrated lime. Limestone utilized in sugar making, for smelter flux, as a fertilizer, and other special industrial uses, are classified under 'Industrial Materials.' That consumed in cement manufacture is included in the value of cement.

Lime Production of California, by Years.

The following tabulation gives the amounts and value of lime produced in California by years since 1894 when compilation of such records was begun by the State Mining Bureau. The figures for quantity have been recalculated from 'barrels' to 'tons' for the years 1894-1922 (inc.):

Lime Production of California, by Years

Year	Tons	Value	Year	Tons	Value
1894.....	37,350	\$318,700	1915.....	35,653	\$286,304
1895.....	39,776	386,094	1916.....	49,364	390,475
1896.....	30,275	261,505	1917.....	50,073	311,380
1897.....	28,780	252,900	1918.....	43,684	461,315
1898.....	29,786	254,010	1919.....	42,070	552,043
1899.....	29,985	314,575	1920.....	46,314	557,232
1900.....	31,252	283,699	1921.....	46,353	610,619
1901.....	31,738	334,688	1922.....	57,875	671,747
1902.....	44,866	369,616	1923.....	70,894	788,834
1903.....	49,659	418,280	1924.....	62,029	703,355
1904.....	57,945	571,749	1925.....	61,922	685,528
1905.....	61,700	555,322	1926.....	63,568	670,837
1906.....	68,927	763,060	1927.....	60,498	631,497
1907.....	68,422	756,376	1928.....	56,616	547,919
1908.....	39,639	379,243	1929.....	42,834	417,101
1909.....	52,075	577,824	1930.....	47,662	452,084
1910.....	47,951	477,683	1931.....	36,189	360,523
1911.....	42,959	390,988	1932.....	27,510	254,223
1912.....	52,212	464,440			
1913.....	61,344	528,547			
1914.....	43,996	378,663			
			Totals.....	1,851,745	\$18,390,978

MAGNESITE

Bibliography: State Mineralogist Reports XII-XV (inc.), XVII-XXVII (inc.). Bulletins 38, 79, 91. U. S. Geol. Surv., Bulletins 355, 540. Min. Res. 1913, Pt. II, pp. 450-453. Min. & Sci. Press, Vol. 114, p. 237. "Magnesite"—Hearings before Comm. on Ways and Means, House of Repr., on H. R. 5218, June 16, 17, and July 17, 1919. Eng. Soc. W. Penn., Proc. 1913, Vol. 29, pp. 305-388, 418-444. Eng. & Min. Jour.-Pres, Vol. 114, July 29, and Dec. 2, 1922. U. S. Tariff Comm., "Crude and Caustic Calcined Magnesite. A Preliminary Statement of Information," May 19, 1926.

The production of crude magnesite in California during 1932 came from a single property each in Santa Clara and Stanislaus counties, both being operated by the same company. The annual details are concealed under the 'Unapportioned' item to conceal the output of a single operator. Practically all was shipped in the calcined form. The 1932 output showed a decrease in both quantity and value from the 1931 figures, which were 21,576 short tons of crude valued at \$182,283, of which only a small amount was sold as crude. The operators' reports showed that a total of 8781 short tons of calcined material valued at \$298,722 rail-shipping point was shipped during 1931, of which about 21 per cent was dead-burned and periclase for refractories, the balance went to the plastic trade. From 2 to 2½ tons of crude material are required to make one ton of calcined. The average price of crude magnesite reported for 1932 was \$10.00 per ton, compared with \$8.45 in 1931; \$10.04 in 1930; \$10.32 in 1929 and \$11 in 1928.

In California the known deposits are mostly in the metamorphic rocks of the Coast Ranges and the Sierra Nevada, being associated with serpentine areas. The notable exceptions are the sedimentary deposits at Bissell in Kern County and at Afton in San Bernardino County. Several thousand tons have been shipped from the Bissell deposit; and small shipments have been made from the Afton property.

Imports.

The tariff act of 1930 placed the following import duties on magnesite: Crude magnesite $\frac{1}{2}\frac{5}{8}\text{¢}$ per lb., caustic-calcined magnesite $\frac{1}{16}\text{¢}$ per lb., dead-burned and grain magnesite, not suitable for manufacture into oxychloride cements, $\frac{3}{40}\text{¢}$ per lb.; magnesite brick $\frac{3}{4}\text{¢}$ per lb. and 10% ad valorem. The figures of imports for 1932, as published by the U. S. Bureau of Foreign and Domestic Commerce, show a total of 8920 short tons valued at \$135,118, as compared with 23,405 tons worth \$391,315 in 1931.

Total Magnesite Production of California.

The first commercial production of magnesite in California was made in the latter part of 1886 from the Cedar Mountain district,¹ southeast of Livermore, Alameda County. Shipments amounting to 'several tons' or 'several carloads' were sent by rail to New York; but there is apparently no exact record of the amount for that first year. The statistical records of the State Mining Bureau began with the year 1887, and the table herewith shows the figures for amount and value, annually, from that time. Shipments of magnesite from Napa County began in 1891 from the Snowflake Mine; from the Red Mountain deposits in Santa Clara County, in 1899; and from Tulare County in 1900.

Total Magnesite Production of California

Year	Tons	Value	Year	Tons	Value
1887.....	600	\$9,000	1911.....	8,858	\$67,430
1888.....	600	9,000	1912.....	10,512	105,120
1889.....	600	9,000	1913.....	9,632	77,056
1890.....	600	9,000	1914.....	11,438	114,380
1891.....	1,500	15,000	1915.....	30,271	283,461
1892.....	1,500	15,000	1916.....	154,052	1,311,893
1893.....	1,093	10,930	1917.....	209,648	1,976,227
1894.....	1,440	10,240	1918.....	83,974	803,492
1895.....	2,200	17,000	1919.....	44,696	452,094
1896.....	1,500	11,000	1920.....	83,695	1,033,491
1897.....	1,143	13,671	1921.....	47,837	511,102
1898.....	1,263	19,075	1922.....	55,637	594,665
1899.....	1,280	18,480	1923.....	73,963	946,643
1900.....	2,252	19,333	1924.....	67,236	900,183
1901.....	4,726	43,057	1925.....	64,623	872,944
1902.....	2,830	20,655	1926.....	50,915	587,642
1903.....	1,361	20,515	1927.....	46,093	577,887
1904.....	2,850	9,298	1928.....	45,645	501,590
1905.....	3,933	16,221	1929.....	47,269	488,014
1906.....	4,032	40,320	1930.....	38,681	388,472
1907.....	6,405	57,720	1931.....	21,576	182,283
1908.....	10,582	80,822	1932.....	*	*
1909.....	7,942	62,588			
1910.....	16,570	113,887	Totals.....	1,285,503	\$13,426,881

* Combined under "Unapportioned."

¹ See U. S. Geol. Surv.; Mineral Resources of U. S., 1886, pp. 6 and 696.

MARBLE

Bibliography: State Mineralogist Reports XII–XV (inc.), XVII–XXVI (inc.). Bulletin 38. U. S. Bur. of Mines, Bull. 106.

The 1932 production of marble in California was valued at \$42,505 (including some onyx and travertine from Solano County and a small amount of limestone used as building stone and flagstone coming from an operator in Santa Barbara County). The marble came from a single quarry each in Amador and Tuolumne counties. The 1932 output showed a decrease in value from that of 1931 which was worth \$81,760. During the last few years there has been a steadily increasing demand for flat stratified stones or flagstone to be used with both Spanish and English types of architecture.

California has many beautiful and serviceable varieties of marble, suitable for almost any conceivable purpose of construction or decoration. In the decorative class are deposits of onyx marble of beautiful coloring and effects. There is also serpentine marble suitable for electrical switchboard use.

Marble Production of California, by Years.

Data on annual production since 1887, as compiled by the State Mining Bureau, follows. Previous to 1894 no records of amounts were preserved.

Total Production of Marble in California, by Years

Year	Cubic feet	Value	Year	Cubic feet	Value
1887		\$5,000	1911	20,201	\$54,103
1888		5,000	1912	27,820	74,120
1889		87,030	1913	41,654	113,282
1890		80,000	1914	25,436	48,832
1891		100,000	1915	22,186	41,518
1892		115,000	1916	25,954	50,280
1893		40,000	1917	24,755	62,950
1894	38,441	98,326	1918	^a 17,428	49,898
1895	14,864	56,566	1919	25,020	74,482
1896	7,889	32,415	1920	^b 29,531	92,899
1897	4,102	7,280	1921	30,232	98,395
1898	8,050	23,594	1922	38,321	127,792
1899	9,682	10,550	1923	28,015	124,919
1900	4,103	5,891	1924	^c 31,579	140,253
1901	2,945	4,630	1925	35,664	116,105
1902	19,305	37,616	1926	34,806	119,999
1903	84,624	97,354	1927	^b 42,308	103,689
1904	55,401	94,208	1928	^b 34,324	82,190
1905	73,303	129,450	1929	^b 72,881	93,661
1906	31,400	75,800	1930	^b 65,775	82,194
1907	37,512	118,066	1931	^b 37,776	81,760
1908	18,653	47,665	1932	^b 25,506	42,505
1909	79,600	238,400			
1910	18,960	50,200	Total value		\$3,435,867

^a Includes onyx and serpentine.

^b Includes onyx and travertine.

ONYX and TRAVERTINE

Bibliography: State Mineralogist Reports XII–XV (inc.), XVII, XVIII, XXI, XXIII. Bulletin 38.

Onyx and travertine are known to exist in a number of places in California, but there has been only a small and irregular production

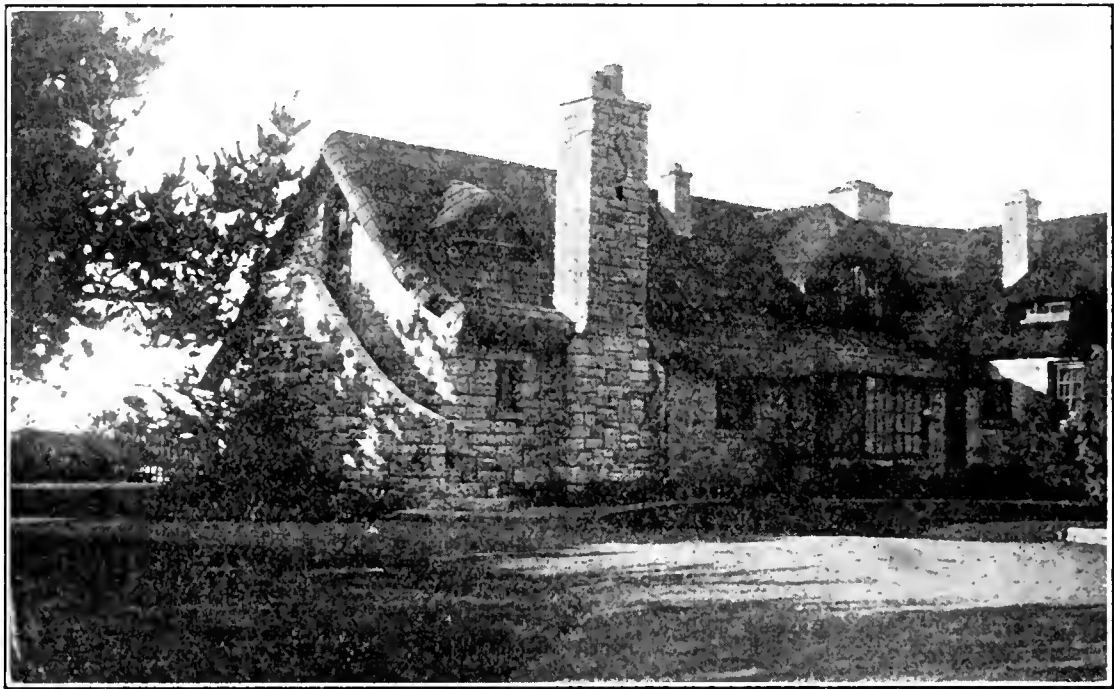
since the year 1896. In 1932 there were two producers of travertine in Solano County. The 1932 output showed a decrease in both quantity and value from that of 1931 the figures of which are combined with marble. This material is used in terrazzo, auto gear-shift handles, bases for fountain-pen desk sets, and other ornamental purposes.

Onyx Production of California, by Years.

Production by years has been as follows :

Year	Value	Year	Value
1887.....	*	1921.....	\$1,294
1888.....	\$900	1922.....	3,320
1889.....	900	1923.....	2,510
1890.....	900	1924.....	*
1891.....	1,500	1925.....	16,120
1892.....	2,400	1926.....	7,575
1893.....	1,800	1927.....	*
1894.....	27,000	1928.....	*
1895.....	20,000	1929.....	*
1896.....	12,000	1930.....	*
1918.....	24,000	1931.....	*
1919.....	*	1932.....	*
1920.....			
		Total value.....	\$122,219

* See under Marble.



Residence built of Carmel stone, from Monterey County.

Photo by courtesy of John Bathen.

SANDSTONE

Bibliography: State Mineralogist Reports XII-XV, XVII, XVIII, XXI, XXIII, XXVI-XXVIII (inc.). Bulletin 38. U. S. Bur. of Mines, Bull. 124.

An unlimited amount of high-grade sandstone is available in California, but the wide use of concrete in buildings of every character, as well as the popularity of a lighter-colored building stone, has curtailed

production in this branch of the mineral industry during recent years almost to the vanishing point. In 1932 a total of 41,793 cu. ft. of sandstone valued at \$13,286, was quarried in California and came from properties in Los Angeles, Monterey, Napa, San Luis Obispo, Tehama, and Ventura counties, by nine operators; compared with 110,244 cu. ft. valued at \$30,960 in 1931.

Practically all of the material was flagstone which is used in garden walks, fountains, walls and fireplaces to give effect to Spanish and English types of homes. The material reported from Monterey and San Luis Obispo counties is in reality an indurated shale of the Monterey series, of a cream color and utilized as a building stone. Part of the material coming from Los Angeles County was schist and indurated shale.

A large portion of the sandstone was sold for landscape work and used as stepping stones for walks and for fountains, walls, etc.

Sandstone Production of California, by Years.

Amount and value, so far as contained in the records of this Bureau, are presented herewith, with total value from 1887 to date:

Year	Cubic feet	Value	Year	Cubic feet	Value
1887.....		\$175,000	1911.....	255,313	\$127,314
1888.....		150,000	1912.....	66,487	22,574
1889.....		175,598	1913.....	62,227	27,870
1890.....		100,000	1914.....	111,691	45,322
1891.....		100,000	1915.....	63,350	8,438
1892.....		50,000	1916.....	17,270	10,271
1893.....		26,314	1917.....	31,090	7,074
1894.....		113,592	1918.....	900	400
1895.....		35,373	1919.....	5,400	3,720
1896.....		28,379	1920.....	10,500	2,300
1897.....		24,086	1921.....	10,150	2,112
1898.....		46,384	1922.....	900	1,100
1899.....	56,264	103,384	1923.....	7,000	13,000
1900.....	378,468	254,140	1924.....	6,700	3,600
1901.....	266,741	192,132	1925.....	14,704	14,362
1902.....	212,123	142,506	1926.....	34,100	17,500
1903.....	353,002	585,309	1927.....	22,900	205,400
1904.....	363,487	567,181	1928.....	134,100	43,250
1905.....	302,813	483,268	1929.....	177,655	49,881
1906.....	182,076	164,068	1930.....	160,704	56,404
1907.....	159,573	148,148	1931.....	110,244	30,960
1908.....	93,301	55,151	1932.....	41,793	13,286
1909.....	79,240	37,032			
1910.....	165,971	80,443	Total value.....		\$4,543,626

SERPENTINE

Bibliography: State Mineralogist Report XV. Bulletin 38.

Serpentine has not been produced in California to a very large extent at any time. A single deposit, that on Santa Catalina Island, has yielded the principal output to date. Some material was shipped from there in 1917 and 1918, being the only output recorded since 1907. It was used for decorative building purposes and for electrical switchboards. As there was but a single operator, the figures were combined with those of marble output for those years.

Serpentine Production of California, by Years.

The following table shows the amount and value of serpentine from 1895 as recorded by this Bureau:

Total Serpentine Production in California

Year	Cubic feet	Value	Year	Cubic feet	Value
1895.....	4,000	\$4,000	1904.....	200	\$2,310
1896.....	1,500	6,000	1905.....		
1897.....	2,500	2,500	1906.....	847	1,694
1898.....	750	3,000	1907.....	1,000	3,000
1899.....	500	2,000	1917.....	^a	^a
1900.....	350	2,000	1918.....	^b	^b
1901.....	89	890	1919.....		
1902.....	512	5,065	Totals.....	12,347	\$33,259
1903.....	99	800			

^a Under 'Unapportioned.'
^b See under Marble.

SLATE

Bibliography: State Mineralogist Reports XV, XVIII, XXIV. Bulletin 38. U. S. Geol. Surv., Bull. 586. U. S. Bur. of Mines, Bull. 218.

Slate was first produced in California in 1889. Up to and including 1910 such production was continuous, but since then it has been irregular. Large deposits of excellent quality are known in the state, especially in El Dorado, Calaveras and Mariposa counties, but the demand has been light owing principally to competition of cheaper roofing materials.

The production of slate in California for 1931 and 1932 was 8234 tons valued at \$55.182 f.o.b. rail-shipping point. The 1932 figures show a slight increase in amount with a decrease in value compared with previous year. The annual details are concealed under 'Unapportioned' owing to a single operator in each El Dorado and Tuolumne counties. Practically all of this slate was crushed and used for roofing granules.

Total Production of Slate in California.

A complete record of amount and value of slate produced in California follows:

Year	Squares	Value	Year	Squares	Value
1889.....	4,500	\$18,089	1908.....	6,000	\$60,000
1890.....	4,000	24,000	1909.....	6,961	45,660
1891.....	4,000	24,000	1910.....	1,000	8,000
1892.....	3,500	21,000	1911.....		
1893.....	3,000	21,000	1915.....	1,000	5,000
1894.....	1,800	11,700	1916.....		
1895.....	1,350	9,450	1920.....	8	80
1896.....	500	2,500	1921.....		
1897.....	400	2,800	1922.....	200	2,400
1898.....	400	2,800	1923.....		
1899.....	810	5,900	1926.....	^a	7,371
1900.....	3,500	26,250	1927.....	^b 2,686	17,960
1901.....	5,100	38,250	1928.....	^b 4,075	31,263
1902.....	4,000	30,000	1929.....		
1903.....	10,000	70,000	1930.....	^b 8,220	71,347
1904.....	6,000	50,000	1931.....		
1905.....	4,000	40,000	1932.....	^b 8,234	55,182
1906.....	10,000	100,000	Total value.....		\$862,002
1907.....	7,000	60,000			

* Annual details concealed under 'Unapportioned.'
^a Quantity not shown as both 'squares' and 'tons' included.
^b Tons.

MISCELLANEOUS STONE

Bibliography: State Mineralogist Reports XII-XXVII (inc.).
Bulletin 38; also annual statistical bulletins from 1915 to date.

'Miscellaneous stone' is the name used throughout this report as the title for that branch of the mineral industry covering crushed rock of all kinds, paving blocks, sand and gravel, and pebbles for grinding mills. The foregoing are very closely related from the standpoint of the producer; therefore it has been found to be most satisfactory to group these items as has been done in recent reports of this Bureau. So far as it has been possible to do so, crushed rock production has been subdivided into the various uses to which the product was put. It will be noted, however, a very large percentage of the output has been tabulated under the heading 'Unclassified.' This is necessary because of the fact that many of the producers have no way of telling to what specific use their rock was put (or at least the proportions to each use) after they have quarried and sold the same to distributors and contractors.

In addition to amounts produced by commercial firms, both corporations and individuals, there is hardly a county in the state but uses more or less gravel and broken rock on its roads. Of much of this, particularly in the country districts, there is no definite record kept.

Both the output of sand and gravel and crushed rock in California during 1932 showed a marked decrease in both amount and value from that of the previous year. This resulted in a total value of \$7,183,643 for 'miscellaneous stone' for 1932, as compared with \$11,848,531 in 1931.

As for several years past Los Angeles County led all counties by a wide margin in the annual output of these products, its 1932 yield being valued at \$1,990,053 (compared with \$3,010,537 in 1931); followed by Alameda second with \$813,165; Contra Costa third with \$231,590; followed by Santa Clara, Riverside, San Bernardino, Calaveras, Marin, San Diego, Imperial, and San Mateo counties in order named.

Paving Blocks.

There was no production of paving blocks in California during the year 1932.

The paving block industry has decreased materially of recent years, practically to the vanishing point, because of the increased construction of smoother pavements demanded by motor vehicle traffic. The blocks made in Solano County were of basalt; those from Sonoma are of basalt, andesite, and some trachyte, while those from Madera, Placer, Riverside, San Bernardino, and San Diego are of granite; and those from San Mateo County a sandstone.

The amount and value of paving block production, annually, since 1887 has been as follows:

Year	Amount M	Value	Year	Amount M	Value
1887	*10,000	\$350,000	1911	4,141	\$210,819
1888	10,500	367,500	1912	11,018	578,355
1889	7,303	297,236	1913	6,364	363,505
1890	7,000	245,000	1914	6,053	270,598
1891	5,000	150,000	1915	3,285	171,092
1892	*3,000	96,000	1916	1,322	54,362
1893	2,770	96,950	1917	938	38,567
1894	2,517	66,981	1918	372	17,000
1895	2,332	73,338	1919	27	1,350
1896	4,161	77,581	1920	63	3,155
1897	1,711	35,235	1921	4	280
1898	1,144	21,725	1922	72	3,924
1899	305	7,861	1923	15	880
1900	1,192	23,775	1924	11	935
1901	1,920	41,075	1925	27	1,350
1902	3,502	112,437	1926		
1903	4,854	134,642	1927	41	2,057
1904	3,977	161,752	1928	25	1,658
1905	3,408	134,347	1929		
1906	4,203	173,432	1930		
1907	4,604	199,347	1931 ^a	66	5,900
1908	7,660	334,780	1932		
1909	4,503	199,803			
1910	4,434	198,916	Totals	135,838	\$5,325,503

* Figures for 1887-1892 (inc.) are for Sonoma County only, as none are available for other counties during that period though Solano County quarries were then also quite active.

^a Annual details concealed under 'Unapportioned.'

Grinding Mill Pebbles.

The 1932 output of grinding mill pebbles in California was combined under 'Unapportioned' to conceal the production of a single operator in San Diego County.

The amount and value of grinding mill pebbles, annually, follows:

Year	Tons	Value
1915	340	\$2,810
1916	20,232	107,567
1917	21,450	90,538
1918	8,628	61,268
1919	2,607	19,272
1920	2,104	17,988
1921	247	1,418
1922	1,571	7,628
1923	2,650	14,936
1924	434	2,969
1925	215	1,385
1926	102	612
1927	288	1,800
1928	372	2,408
1929 } *		
1930 } *	166	1,225
1931 } *		
1932 } *	25	211
Totals	61,431	\$264,035

* Annual details concealed under 'Unapportioned.'

Sand and Gravel.

A considerable part of the gravel excavated is passed through grading and washing plants, and the material over 2 inches in size is crushed. Much of it is utilized in concrete mixtures. Most of the gravel used for road surfacing and repairs as well as that for railroad ballast is creek-run or pit-run material which is spread upon the roads without undergoing any grading or washing.

The distribution of the 1932 output of sand and gravel by counties is given in the following table:

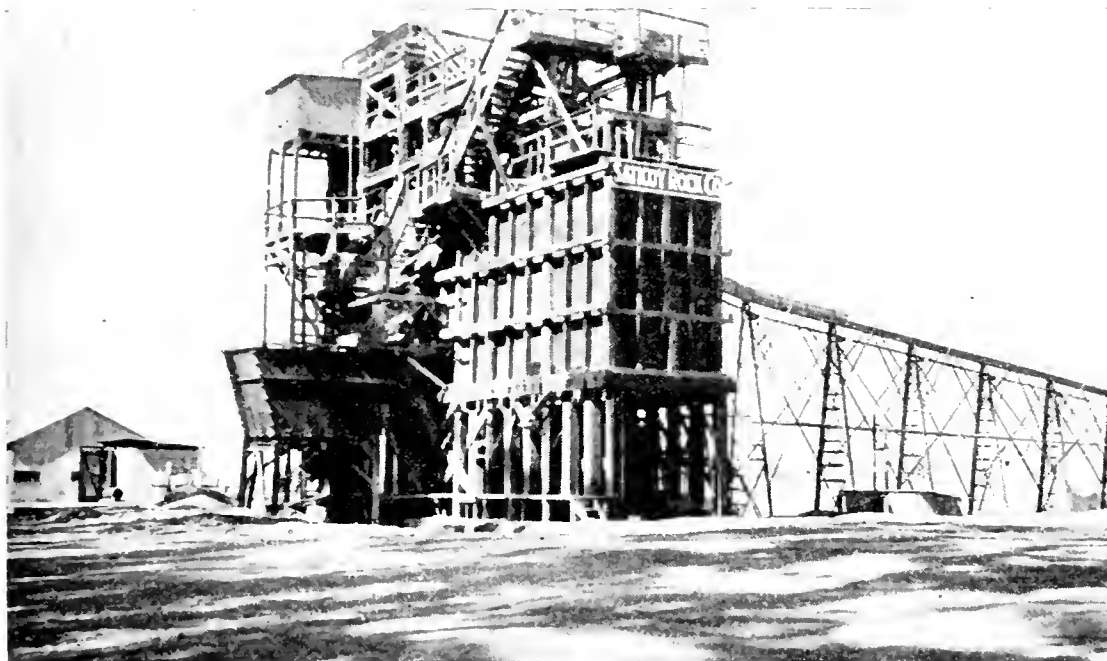
<i>County</i>	<i>Tons</i>	<i>Value</i>	<i>County</i>	<i>Tons</i>	<i>Value</i>
Alameda -----	^a 1,000,057	\$662,608	San Diego -----	^{ab} 184,217	\$146,865
Alpine -----	600	1,100	San Joaquin -----	161,004	58,679
Amador -----	19,301	8,476	San Luis Obispo ---	^a 46,430	24,075
Butte -----	78,608	30,907	San Mateo -----	^a 8,750	4,241
Contra Costa -----	^a 92,246	55,970	Santa Barbara -----	148,617	87,605
Del Norte -----	19,138	4,336	Santa Clara -----	115,411	73,433
Glenn -----	29,850	6,668	Shasta -----	5,588	2,806
Humboldt -----	90,970	33,332	Sierra -----	10,095	6,715
Imperial -----	190,906	79,711	Siskiyou -----	510	170
Kern -----	^c 50,351	27,467	Sonoma -----	207,197	104,931
Lake -----	23,089	17,180	Stanislaus -----	98,093	53,363
Los Angeles -----	^b 2,002,558	877,862	Tehama -----	1,080	787
Marin -----	3,600	1,200	Trinity -----	9,490	17,160
Mariposa -----	26,550	22,625	Tulare -----	15,988	8,689
Mendocino -----	89,084	48,923	Tuolumne -----	4,000	3,000
Merced -----	48,000	22,500	Ventura -----	^a 150,798	68,188
Modoc -----	27,326	5,923	Yolo -----	15,510	12,775
Mono -----	25,380	12,690	Yuba -----	46,691	27,485
Monterey -----	^{ab} 88,392	91,902	Colusa, Fresno,		
Napa -----	37,892	22,669	Inyo, Lassen,		
Orange -----	125,848	54,871	Madera, Plumas,		
Placer -----	15,294	5,059	San Francisco,		
Riverside -----	^{ab} 181,343	111,097	Santa Cruz, and		
Sacramento -----	^a 132,608	70,313	Solano* -----	140,270	89,208
San Benito -----	9,461	8,783			
San Bernardino ---	169,168	75,658	Totals -----	5,947,359	\$3,159,905

* Combined to conceal the output of a single operator in each.

^a Includes molding sand.

^b Includes blast sand.

^c Includes earth.



Saticoy Rock Company's gravel plant, Saticoy, Ventura County.

Photo by W. B. Tucker.

Included in the above is a total of 16,746 tons of molding sand valued at \$37,969 coming from two properties each in Contra Costa and Riverside counties; and one each in Alameda, Monterey, Sacramento, San Diego, San Luis Obispo, San Mateo, and Ventura counties. The 1932 yield showed a decrease compared with 1931, which was 27,651 tons worth \$64,830.

Colusa, Contra Costa, Fresno, Inyo, Kern, Lake, Marin, Orange, Riverside, San Benito, San Diego, San Joaquin ^a	411,561	207,443								411,561	207,443
Butte, Colusa, Contra Costa, Imperial, Madera, Mariposa, Riverside, San Benito, San Bernardino, San Diego, Santa Clara, Santa Cruz, Sonoma ^a											
Butte, Fresno, Imperial, Kern, Lake, Marin, Monterey, Orange, Placer, Riverside, San Benito, San Bernardino, San Luis Obispo, Santa Clara, Santa Cruz, Sonoma, Tulare ^a											
Butte ^a , Colusa ^b , Contra Costa, El Dorado, Inyo ^d , Mariposa, Nevada, Riverside, San Benito, San Francisco, San Joaquin, Solano, Sonoma, Stanislaus ^b , Tuolumne ^a											
Totals	2,411,556	\$1,687,752	501,835	\$459,968	1,104,123	\$912,819	1,396,691	494,329	490,288	5,414,205	\$4,023,738

^a Combined to conceal the output of a single operator.

^b Includes granules for terrazzo.

^c Includes granules for roofing.

^d Includes decomposed granite.

Crushed Rock.

To list the kinds and varieties of rock utilized commercially under this heading would be to run almost the entire gamut of the classification scale. Much depends on the kind available in a given district. Those which give the most satisfactory service are the basalts and other hard, dense, igneous rocks which break with sharp, clean edges. In many localities, river-wash boulders form an important source of such material. In such cases, combined crushing and washing plants obtain varying amounts of sand and gravel along with the crushed sizes. In Sacramento and Butte counties the tailings piles from the gold dredgers are the basis of like operations.

The values given are based on the selling price, f.o.b. cars, barges, or trucks, at the quarry.

Miscellaneous Stone Production of California, by Years.

The amount and value, annually, of crushed rock (including macadam, ballast, rubble, riprap, and that for concrete), and sand and gravel, since 1893, follow:

Crushed Rock, Sand and Gravel, by Years

Year	Tons	Value	Year	Tons	Value
1893.....	371,100	\$456,075	1914.....	9,288,397	\$3,960,973
1894.....	661,900	664,838	1915.....	10,879,497	4,609,278
1895.....	1,254,688	1,095,939	1916.....	9,951,089	4,009,590
1896.....	960,619	839,884	1917.....	8,069,271	3,505,652
1897.....	821,123	600,112	1918.....	6,641,144	3,325,889
1898.....	1,177,365	814,477	1919.....	6,919,188	3,678,322
1899.....	964,898	786,892	1920.....	9,792,122	6,782,414
1900.....	789,287	561,642	1921.....	10,914,145	7,834,540
1901.....	530,396	641,037	1922.....	13,049,644	10,366,231
1902.....	2,056,015	1,249,529	1923.....	19,840,301	15,379,838
1903.....	2,215,625	1,673,591	1924.....	21,451,129	15,962,476
1904.....	2,296,898	1,641,877	1925.....	23,819,137	17,407,113
1905.....	2,624,257	1,716,770	1926.....	24,987,606	19,859,261
1906.....	1,555,372	1,418,406	1927.....	25,126,691	18,912,994
1907.....	2,288,888	1,915,015	1928.....	27,471,794	17,328,044
1908.....	3,998,945	3,241,774	1929.....	27,104,618	17,840,159
1909.....	5,531,561	2,708,326	1930.....	23,514,168	16,430,027
1910.....	5,827,828	2,777,690	1931.....	15,843,313	11,848,531
1911.....	6,487,223	3,610,357	1932.....	11,361,564	7,183,643
1912.....	8,044,937	4,532,598			
1913.....	9,817,616	4,823,056	Totals.....	346,306,359	\$243,994,970

A comparison of the above table of annual production of these materials with the similar table for cement (see *ante*) reveals the fact that the important growth of the crushed rock and gravel business has been coincident with the rapid development of the cement industry from the year 1902.

CHAPTER FIVE

INDUSTRIAL MATERIALS

Bibliography: State Mineralogist Reports XII-XXVIII (inc.). Bulletin 38. Min. & Sci. Press, Vol. 114, March 10, 1917. Spurr and Wormser, "Marketing of Metals and Minerals." "Non-Metallic Minerals," by R. B. Ladoo. See also under each substance.

The following mineral substances have been arbitrarily arranged under the general heading of 'Industrial Materials,' as distinguished from those which have a clearly-defined classification, such as metals, salines, structural materials, etc.

These materials, many of which are mineral earths, are, with four or five exceptions, as yet produced on a comparatively small scale. The possibilities of development along several of these lines are large, and with increasing transportation and other facilities, together with steadily growing demands, the future for this branch of the mineral industry in California is promising. There is scarcely a county in the state but might contribute to the output.

Up to within the last few years, at least, production has been in the majority of instances dependent upon more or less of a strictly local market, and the annual tables show the results of such a condition, not only in the widely-varying amounts of a certain material produced from year to year, but in widely-varying prices of the same material.

The more important of these minerals thus far exploited, so far as shown by value of the output, are barytes, bentonite (fuller's earth), pottery clay, diatomite, dolomite, gypsum, limestone, mineral water, pumice and volcanic ash, pyrite, silica, and soapstone and talc.

This group as a whole showed a decrease in the total value from \$4,741,939 in 1931 to \$3,820,711 in 1932.

The following table gives the comparative figures for the amounts and value of industrial minerals produced in California during the years 1931 and 1932:

Substance	1931		1932		Increase+ Decrease— Value
	Amount	Value	Amount	Value	
Barytes.....	27,682 tons	\$156,647	8,507 tons	\$49,409	\$107,238—
Bentonite (fuller's earth).....	13,960 tons	222,583	4,295 tons	57,670	164,913—
Clay (pottery).....	332,680 tons	408,931	167,284 tons	204,891	204,040—
Dolomite.....	(*)	(*)	35,275 tons	40,956	—
Feldspar.....	4,795 tons	59,921	2,294 tons	15,988	43,933—
Gems.....		5,607		4,961	646—
Gypsum.....	88,354 tons	199,198	46,867 tons	93,818	105,380—
Limestone.....	177,268 tons	560,699	168,950 tons	487,788	72,911—
Mineral water.....	26,164,331 gallons	1,347,860	19,031,224 gallons	1,495,988	148,128+
Pumice and volcanic ash.....	11,711 tons	108,130	9,891 tons	86,034	22,096—
Pyrite.....	25,402 tons	131,174	(*)	(*)	(*)—
Silica (sand and quartz).....	43,330 tons	182,769	33,997 tons	136,324	46,445—
Soapstone and talc.....	13,472 tons	109,940	10,690 tons	122,880	12,940+
Unapportioned.....		\$1,248,480		\$1,024,005	224,475—
Total values.....		\$4,741,939		\$3,820,712	
Net decrease.....					\$921,227—

*Included under 'Unapportioned.'

^a Includes dolomite, diatomite, mineral paint, mica, sillimanite-andalusite-cyanite group and sulphur.

^b Includes asbestos, diatomite, graphite, mica, pyrite, sillimanite-andalusite-cyanite group and sulphur.

ASBESTOS

Bibliography: State Mineralogist Reports XII-XIX (inc.), XXII, XXVII (inc.). Bulletins 38, 91. Canadian Dept. of M., Mines Branch Bulletin 69. Min. and Sci. Press, April 10, 1920, pp. 531-533. Eng. & Min. Jour-Press, Vol. 113, pp. 617-625, 670-677. Asbestology, Vol. 5, No. 7, July, 1927.

During 1932 there was a small output of chrysotile asbestos mined and shipped for testing in California. This material came from Napa County. There was no production of this material in 1931. The figures are combined under the 'Unapportioned' item to conceal the output of a single operator.

Asbestos Production of California, by Years.

Total amount and value of asbestos production in California since 1887, as given in the records of this Bureau, are as follows:

Year	Tons	Value	Year	Tons	Value
1887.....	30	1,800	1911.....	125	\$500
1888.....	30	1,800	1912.....	90	2,700
1889.....	30	1,800	1913.....	47	1,175
1890.....	71	4,260	1914.....	51	1,530
1891.....	66	3,960	1915.....	143	2,860
1892.....	30	1,830	1916.....	145	2,380
1893.....	50	2,500	1917.....	136	10,225
1894.....	50	2,250	1918.....	229	9,903
1895.....	25	1,000	1919.....		
1896.....			1920.....	131	6,240
1897.....			1921.....	410	19,275
1898.....	10	200	1922.....	50	1,800
1899.....	30	750	1923.....	20	200
1900.....	50	1,250	1924.....	70	4,750
1901.....	110	4,400	1925.....		
1902.....			1926.....	25	1,650
1903.....			1927.....		
1904.....	10	162	1928.....	13	1,160
1905.....	112	2,625	1929.....		
1906.....	70	3,500	1930.....	219	6,175
1907.....	70	3,500	1931.....		
1908.....	70	6,100	1932.....	*	*
1909.....	65	6,500			
1910.....	200	20,000	Totals.....	3,083	\$142,710

*Annual details concealed under 'Unapportioned.'

BARYTES

Bibliography: State Mineralogist Reports XII, XIV, XV, XVII, XXI-XXVII (inc.). Bulletins 38, 87. Eng. & Min. Jour-Press, Vol. 114, p. 109, July 15, 1922; Vol. 115, pp. 319-324, Feb. 17, 1923. U. S. Bureau of Mines, Inform. Circ. 6221, 6223.

During 1932 there was a commercial production of crude barytes in California amounting to a total of 8507 short tons valued at \$49,409 f.o.b. rail-shipping point, as compared with the 1931 output of 27,832 tons worth \$156,647. The 1932 output came from a single property, each in Mariposa, Plumas, San Bernardino, Santa Barbara, and Tulare counties. This material was consumed in the manufacture of lithopone, in heavy gravity oil-well drilling mud-fillers, and barium chemicals.

The Tariff Act of 1930 placed a duty on foreign imported barytes ore, crude or unmanufactured, of \$4 per ton; ground or otherwise manufactured, of \$7.50 per ton.

Present quotations for barytes (93% BaSO_4) vary from \$6 to \$7 (Calif. \$7) per ton, crude, f.o.b. rail-shipping point. Most baryte has to be washed and acid treated to remove iron stains or other impurities before being suitable for paint use.

Known occurrences of this mineral in California are located in Inyo, Los Angeles, Mariposa, Monterey, Nevada, San Bernardino, Shasta and Santa Barbara counties. The deposits at El Portal, in Mariposa County, have given the largest commercial production to date, in part witherite (barium carbonate, BaCO_3). Witherite has also been found in Shasta County, but no shipments have yet been made from the deposit.

Total Barytes Production of California.

The first recorded production of barytes in California, according to the statistical reports of the State Mining Bureau, was in 1910. The annual figures are as follows:

Year	Tons	Value	Year	Tons	Value
1910.....	860	\$5,640	1922.....	3,370	\$18,925
1911.....	309	2,207	1923.....	2,925	16,058
1912.....	564	2,812	1924.....		
1913.....	1,600	3,680	1925.....		
1914.....	2,000	3,000	1926.....	4,978	38,165
1915.....	410	620	1927.....	17,993	90,617
1916.....	1,606	5,516	1928.....	13,406	55,888
1917.....	4,420	25,633	1929.....	26,796	168,829
1918.....	100	1,500	1930.....	19,783	133,107
1919.....	1,501	18,065	1931.....	27,832	156,647
1920.....	3,029	20,795	1932.....	8,507	49,409
1921.....	901	4,809			
			Totals.....	142,890	\$821,922

BENTONITE (FULLER'S EARTH)

Bibliography: State Mineralogist Reports XIV, XVII, XVIII, XXI, XXIII, XXV-XXVI (inc.). Bulletins 38, 91. U. S. Bureau of Mines, Bulletin 71. Eng. & Min. Jour.-Press, Vol. 121, pp. 837-842, May 22, 1926.

During 1932 there was produced and shipped in California 4295 short tons of bentonite (fuller's earth) valued at \$57,670, coming from six properties, two of which were in San Bernardino County and one in each, Inyo, Kern, San Benito and San Diego counties. The 1932 output showed a decrease, as compared with that of 1931, which was 13,960 tons worth \$222,583.

Previous to 1931 the Division of Mines classed this material under the heading of "fuller's earth," but it was thought advisable to change the name to bentonite, owing to the fact that much bentonite is employed in uses that can not be classed as fuller's earth and therefore has been classified in these reports under pottery clay. This made a confusion in classification. Bentonite is a name applied to the clays of the montmorillonite and halloysite group ('rock soap').

Fuller's earth includes many kinds of unctuous clays. It is usually soft, friable, earthy, nonplastic, white and gray to dark green in color, and some varieties disintegrate in water. Production has come mainly from Calaveras and Solano counties, with other deposits noted also in Riverside, Fresno, Inyo and Kern counties.

The Tariff Act of June 21, 1930, placed a duty of \$1.50 a ton on foreign produced imported fuller's earth.

Bentonite Production of California by Years.

Bentonite including a small amount of fuller's earth was first produced commercially in this state in 1899, and the total amount and value of the output since that time are as follows:

Year	Tons	Value	Year	Tons	Value
1899.....	620	\$12,400	1917.....	220	\$2,180
1900.....	500	3,750	1918.....	37	333
1901.....	1,000	19,500	1919.....	385	3,810
1902.....	987	19,246	1920.....	600	6,000
1903.....	250	4,750	1921.....	1,185	8,295
1904.....	500	9,500	1922.....	6,606	48,756
1905.....	1,344	38,000	1923.....	3,650	55,125
1906.....	440	10,500	1924.....	5,290	67,295
1907.....	100	1,000	1925.....	5,280	91,842
1908.....	50	1,000	1926.....	23,552	250,192
1909.....	459	7,385	1927.....	13,018	154,764
1910.....	340	3,820	1928.....	53 323	501,743
1911.....	466	5,294	1929.....	15,541	170,563
1912.....	876	6,500	1930.....	12,522	177,964
1913.....	460	3,700	1931.....	13,960	222,583
1914.....	760	5,928	1932.....	4,295	57,670
1915.....	692	4,002			
1916.....	110	550	Totals.....	151,426	\$1,311,851

CLAY (Pottery)

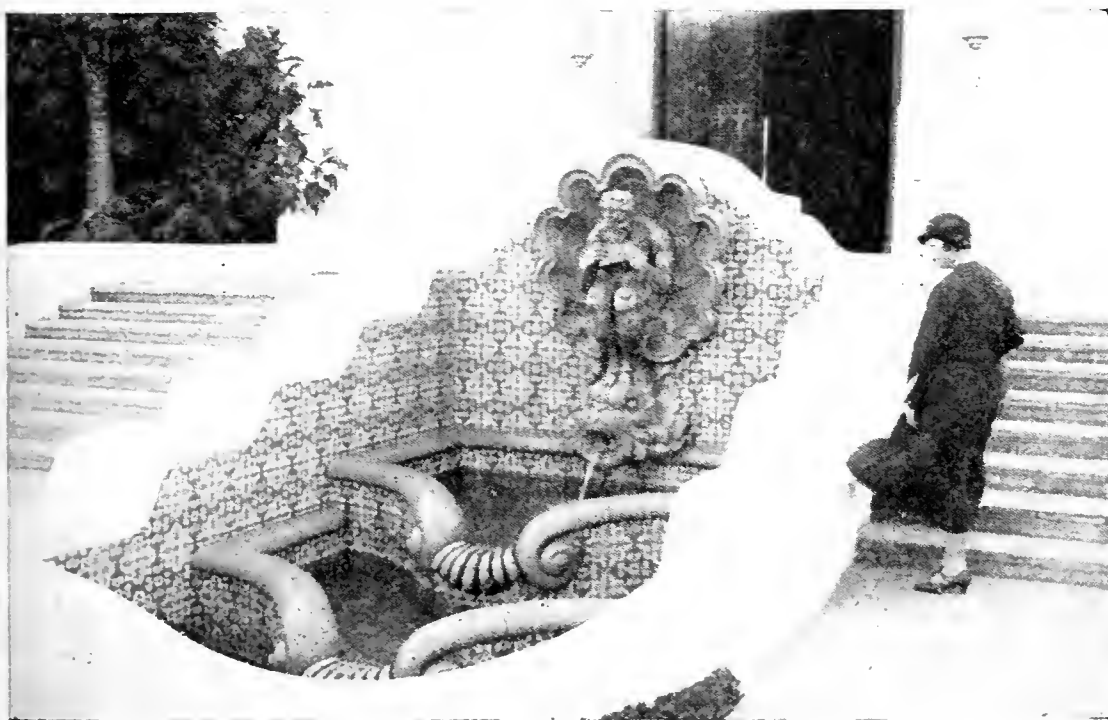
Bibliography: State Mineralogist Reports I, IV, IX, XII–XV, XVIII–XXVII (inc.). Bulletins 38, 99. Preliminary Report No. 7. U. S. Bureau of Standards, Tech. Paper No. 262.

At one time or another in the history of the state, pottery clay has been mined in thirty-three of its counties. Of these, 17 contributed in 1932. In this report, 'pottery clay' refers to all clays used in the manufacture of red and brown earthenware, china and sanitary ware, flower pots, floor, faience and ornamental tiling, architectural terra cotta, sewer pipe, drain and roof tile, etc., and the figures for amount and value are relative to the crude material at the pit, without reference to whether the clay was sold in the crude form or was immediately used in the manufacture of any of the above finished products by the producer. It does not include clay used in making brick and hollow building blocks.

There are many other important uses for clay besides pottery manufacture. Among these may be enumerated paper, cotton goods, and chemicals. Clays of the montmorillonite and halloysite group ('rock soap') are being utilized successfully in the manufacture of soaps and for filtering oils and as oil-well drilling mud, also as an earth filler in irrigating ditches which run through porous ground.

During 1932 there was a total of 48 properties in 17 counties which reported an output of 167,284 short tons of pottery clay having a total value of \$204,890 f.o.b. rail-shipping point for the crude material, as compared with 59 properties in 17 counties, producing 332,680 tons worth \$408,931 in 1931. The decrease in the output of crude clay is accounted for by the decline in the manufacture of clay products.

Because of the fact that a given product often requires a mixture of several different clays, and that these are not all found in the same pit, it is necessary for most clay-working plants to buy some part of their raw materials from other localities. For these reasons, in compiling the clay industry figures, much care is required to avoid duplications. So far as we have been able to segregate the figures, from the data sent in by the operatives, we have credited the clay output to the counties from which the raw material originated; and have deducted tonnages used in brick manufacture, as bricks are classified separately, herein.



California tile at Agua Caliente, Lower California, Mexico.

Photo by Walter W. Bradley.

A tabulation of the direct returns from the producers, by counties, for the year 1932 is shown herewith:

Pottery Clay in 1932

County	Tons	Value	Used in the manufacture of
Alameda	7,333	\$4,887	Architectural terra cotta; chimney, drain and sewer pipe; faience, floor, decorative and roofing tile; garden furniture, refractories and various.
Amador	20,284	26,373	Architectural terra cotta; fire-clay products and refractories; chimney, drain and sewer pipe; floor, mantel and roofing tile; electrical porcelain and various.
Contra Costa	1,026	1,490	Roofing, floor and mantel tile; sagger; drain and sewer pipe and various.
Los Angeles	38,453	21,978	Architectural terra cotta; conduit and segment blocks, electrical porcelain, red earthen ware, refractories; chimney, drain and sewer pipe; vents; floor, mantel and roofing tile; art pottery and various.
Orange	9,892	33,217	Stone ware, refractories, vents; drain, floor and mantel tile and various.
Placer	35,825	49,037	Architectural terra cotta; chimney, drain and sewer pipe; faience, floor, mantel and roofing tile; red earthen ware, electrical porcelain, sanitary ware and various.
Riverside	23,958	29,839	Conduit, sewer and drain pipe; red earthen ware; faience, floor, mantel and roofing tile and various.
San Bernardino	1,096	6,491	Floor and roofing tile; stone ware, sanitary ware, art pottery, refractories and various.
Santa Clara	1,876	1,335	Sewer pipe, art pottery; drain, floor, mantel and roofing tile; stone ware and various.
Ventura	9,774	1,683	Oil well drilling mud, drain floor tile.
Calaveras, Humboldt, Imperial, Kern, ^a Sacramento, San Diego and Stanislaus*	17,767	28,555	Drain, roofing and mantel tile; sagger; electrical porcelain; refractory, red earthen ware, garden furniture, oil well drilling mud and various.
Totals	167,284	\$204,890	

*Combined to conceal the output of a single operator in each.

^a Includes clay and shale used for oil well drilling mud.

POTTERY CLAY PRODUCTS

The values of the various pottery clay products made in California during 1932 totaled \$4,858,573 as compared with \$8,742,331 in 1931, their distribution being shown in the following tabulation:

Product	Number of producers	Tons	Value
Architectural terra cotta	7	8,049	\$792,513
Chimney pipe and flue lining	8	3,808	103,403
Drain pipe	16	3,565	56,701
Sewer pipe	6	22,448	443,779
Roofing tile	21	61,508	429,643
Electrical porcelain	6	-----	346,468
Red earthenware	8	-----	106,205
Stoneware and chemical stoneware	5	-----	263,237
Chinaware and semivitreous tableware	4	-----	241,456
Sanitary ware and plumbing fixtures	6	-----	857,692
Floor, faience, mantel and hand-made tile	34	-----	1,056,925
Conduit pipe	3	-----	33,371
Ground fire clay and high temperature cement	7	2,587	36,071
Miscellaneous, industrial porcelain, garden furniture, specialties, art pottery, radiance, refractories, segment blocks 'haydite,' grog, etc.	20	-----	99,109
Total value			\$4,858,573

All groups showed a decrease in value from their 1931 totals.

Pottery Clay Production of California, by Years.

Amount and value of crude pottery clay output in California since 1887 are given in the following table:

Year	Tons	Value	Year	Tons	Value
1887	75,000	\$37,500	1911	224,576	\$252,759
1888	75,000	37,500	1912	199,605	215,683
1889	75,000	37,500	1913	231,179	261,273
1890	100,000	50,000	1914	179,948	167,552
1891	100,000	50,000	1915	157,866	133,724
1892	100,000	50,000	1916	134,636	146,538
1893	24,856	67,284	1917	166,298	154,602
1894	28,475	35,073	1918	112,423	166,788
1895	37,660	39,685	1919	135,708	245,019
1896	41,907	62,900	1920	203,997	440,689
1897	24,592	30,290	1921	225,120	362,172
1898	28,947	33,747	1922	277,232	473,184
1899	40,600	42,700	1923	376,863	697,841
1900	59,636	60,956	1924	417,928	651,857
1901	55,679	39,144	1925	537,587	674,376
1902	67,933	74,163	1926	801,461	806,509
1903	90,972	99,907	1927	867,419	872,661
1904	84,149	81,952	1928	887,807	1,394,950
1905	133,805	130,146	1929	839,949	1,127,527
1906	167,267	162,283	1930	938,586	795,517
1907	160,385	254,454	1931	332,680	408,931
1908	208,042	325,147	1932	167,284	204,890
1909	299,424	465,647			
1910	249,028	324,099	Totals	10,744,509	\$13,247,119

DIATOMITE (DIATOMACEOUS EARTH)

Bibliography: State Mineralogist Reports II, XII-XV (inc.), XVII-XXVII (inc.). Bulletins 38, 67, 91. Am. Inst. Min. Eng., Bull. 104, August, 1915, pp. 1539-1550. U. S. Bur. of Mines, Rep. of Investigations: Serial No. 2431, Jan. 1923. Eng. & Min. Jour.-Press, Vol. 115, pp. 1152-1154, June 30, 1923.

Diatomite, also known as diatomaceous earth, infusorial earth, tripolite and kieselguhr, is very light (when dry a cubic foot weighs 18 to 20 pounds) and extremely porous, chalk-like materials composed of pure silica (chalk, being calcareous) which have been laid down under water and consist of the remains of microscopical infusoria and diatoms. The former are animal remains, and the latter are from plants.

The most important deposits in California thus far known are located in Monterey, Orange, San Luis Obispo, and Santa Barbara counties. The Santa Barbara material is diatomaceous and is of a superior quality, particularly for filtration uses which bring the higher prices. Infusorial or diatomaceous earths are also found in Fresno, Kern, Los Angeles, Plumas, San Benito, San Bernardino, San Joaquin, Shasta, Sonoma, and Tehama counties.

As about 80 per cent of the California output is from a single operator, we have concealed the exact figures under the 'Unapportioned' item in the state and county totals. There were four operators during 1932 in Fresno, Los Angeles, Monterey, and Santa Barbara counties. The shipments during the year showed a slight decrease in total tonnage and value compared with 1931.

The material shipped was utilized for insulation of both heat and sound, filtration, paint, pigment, cement admixture, fillers, abrasives and for clarification of gasoline and kerosene.

Total Production of Diatomite in California.

The first recorded production of these materials in California occurred in 1889; total amount and value of output, to date, are as follows:

Year	Tons	Value	Year	Tons	Value
1889	39	\$1,335	1912	4,129	\$17,074
1890			1913	8,645	35,968
1891			1914	12,840	80,350
1892			1915	12,400	62,000
1893	50	2,000	1916	15,322	80,649
1894	51	2,040	1917	24,301	127,510
1895			1918	35,963	189,459
1896			1919	40,200	217,800
1897	5	200	1920	60,764	1,056,260
1898			1921	*90,739	1,016,675
1899			1922		
1900			1923		
1901			1924	*193,064	5,729,736
1902	422	2,532	1925	*275,403	1,995,923
1903	2,703	16,015	1926		
1904	6,950	112,282	1927		
1905	3,000	15,000	1928	*300,017	4,848,661
1906	2,430	14,400	1929		
1907	2,531	28,948	1930		
1908	2,950	32,012	1931	*	*
1909	500	3,500	1932		
1910	1,843	17,617	Totals	1,098,455	\$15,723,616
1911	2,194	19,670			

* Annual details concealed under 'Unapportioned.'

DOLOMITE

Bibliography: State Mineralogist Reports XV, XVII, XXVII.

The production of dolomite in California during 1932 was 35,275 short tons worth \$40,956 and came from two properties in Inyo County and one in Monterey County. The 1930 and 1931 outputs were combined to conceal the annual figures of either of the two operators during this period. The material shipped was utilized for steel furnace flux and refractories, plaster, stucco dash-coat, and for manufacture of CO₂.

Dolomite Production of California, by Years.

Previous to the 1915 statistical report of the State Mining Bureau, dolomite was included under limestone, as the two minerals are closely related chemically; but since dolomite, as such, has been found to have certain distinctive applications, we here give it a separate classification.

Amount and value of the output of dolomite, annually, have been as follows:

Year	Tons	Value
1915.....	4,192	\$14,504
1916.....	13,313	46,566
1917.....	27,911	66,416
1918.....	24,560	79,441
1919.....	24,502	67,953
1920.....	42,388	132,791
1921.....	31,195	99,155
1922.....	52,409	114,911
1923.....	69,519	142,615
1924.....	28,843	71,271
1925.....	42,852	104,900
1926.....	68,640	119,313
1927.....	45,976	79,442
1928.....	38,379	85,342
1929.....	58,644	156,928
1930)*.....	66,564	161,245
1931)*.....	35,275	40,956
1932.....		
Totals.....	675,162	\$1,583,749

* Annual details concealed under 'Unapportioned.'

FELDSPAR

Bibliography: State Mineralogist Reports XV, XVII-XXVII (inc.). Bulletins 67, 91. U. S. Bureau of Mines, Bulletin 92. Eng. & Min. Jour.-Pres, Vol. 115, pp. 535-538. Mar. 24, 1923.

Feldspar was produced by three operators in two counties (Inyo and San Diego) in California during 1932 to the amount of 2294 short tons valued at \$15,988. This was a decrease in quantity and value from the 1931 figures which were 4795 tons and \$59,921.

Total Feldspar Production of California.

Total amount and value of feldspar production in California since the inception of the industry are given in the following table, by years:

Total Feldspar Production in California

Year	Tons	Value	Year	Tons	Value
1910.....	760	\$5,720	1922.....	4,587	\$37,109
1911.....	740	4,560	1923.....	11,100	81,800
1912.....	1,382	6,180	1924.....	9,055	68,112
1913.....	2,129	7,850	1925.....	8,165	59,615
1914.....	3,530	16,565	1926.....	7,300	56,400
1915.....	1,800	9,000	1927.....	10,932	86,101
1916.....	2,630	14,350	1928.....	14,628	93,745
1917.....	11,792	46,411	1929.....	13,327	78,404
1918.....	4,132	22,061	1930.....	5,014	35,654
1919.....	1,272	12,965	1931.....	4,795	59,921
1920.....	4,518	26,189	1932.....	2,294	15,988
1921.....	4,349	28,343	Totals.....	131,231	\$873,038

FLUORSPAR

Bibliography: State Mineralogist Reports XVII, XVIII, XXIV, XXVI. Bulletins 67, 91. Eng. & Min. Jour.-Press, Vol. 177, pp. 489-492, Mar. 22, 1924.

Fluorspar, or calcium fluoride, CaF_2 , is one of the most important nonmetallic minerals from an industrial standpoint. About 80 per cent of the commercial mineral is prepared in the 'gravel' form and utilized as a flux in the manufacture of steel, for which use no substitute has yet been found.

In California deposits have been reported in Los Angeles, Mono, Riverside and San Bernardino counties, but no commercial production has resulted except in 1917-1918, when a total of 79 tons valued at \$991 was shipped from Riverside County.

Present quotations (Metal and Mineral Markets) are: not less than 85 per cent CaF_2 and not over 5 per cent SiO_2 , \$14 per ton; #2 lamp \$16 per ton.

GEMS

Bibliography: State Mineralogist Reports II, XIV, XV, XVII, XVIII, XX, XXI-XXVII (inc.). Bulletins 37, 67, 91. U. S. G. S., 'Mineral Resources of the U. S.'; Bull. 603, p. 208. Bull. Dept. Geol. Univ. of Cal., Vol. 5, pp. 149-153, 331-380. Am. Jour. Sci., Vol. 31, p. 31.

The production of gem materials in California has been somewhat irregular and uncertain since 1911. The compilation of complete statistics is difficult owing to widely-scattered places at which stones are gathered and marketed, for the most part in a small way. The gem material reported in California during 1932 had a total value of \$4,961 in the rough. The 1932 output came from Butte, Calaveras, Fresno, Modoc, Riverside, San Bernardino, San Diego, and Tulare counties and consisted of diamonds, quartz crystals, topaz, Iceland spar, blue-agate, jasper, agate, beryl, tourmaline, chrysoprase, and aquamarine. The above showed a decreased value from the 1931 output, which was worth \$5,607.

Total Production of Gem Materials in California.

The value of the gem output in California annually since the beginning of commercial production is as follows:

Year	Value	Year	Value
1900.....	\$20,500	1917.....	\$3,049
1901.....	40,000	1918.....	650
1902.....	162,100	1919.....	5,425
1903.....	110,500	1920.....	36,056
1904.....	136,000	1921.....	10,954
1905.....	148,500	1922.....	1,312
1906.....	497,090	1923.....	13,220
1907.....	232,642	1924.....	4,800
1908.....	208,950	1925.....	10,663
1909.....	193,700	1926.....	9,049
1910.....	237,475	1927.....	7,035
1911.....	51,824	1928.....	22,200
1912.....	23,050	1929.....	26,850
1913.....	13,740	1930.....	3,540
1914.....	3,970	1931.....	5,607
1915.....	3,565	1932.....	4,961
1916.....	4,752		
		Total.....	\$2,253,729

GRAPHITE

Bibliography: State Mineralogist Reports XIII, XIV, XV, XVII, XXVI (inc.). Bulletins 67, 91. U. S. G. S., Min. Res., 1914, Pt. II.

Graphite (also called plumbago) has been produced from time to time in the state, coming principally from Sonoma and Los Angeles counties.

Occurrence of graphite has been reported at various times from Calaveras, Fresno, Imperial, Inyo, Los Angeles, Mendocino, San Bernardino, San Diego, Siskiyou, Sonoma and Tuolumne counties. During 1931 and 1932 there was a small production of graphite in California from a property in Los Angeles County. The annual details are concealed under 'Unapportioned,' owing to there having been but a single operator.

Graphite Production of California, by Years.

According to the records of the State Mining Bureau, the graphite production of California, by years, has been as follows:

Year	Pounds	Value
1901	128,000	\$4,480
1902	84,000	1,680
1903		
1913	2,500	25
1914		
1915		
1916	29,190	2,335
1917		
1918	*770,000	37,225
1919		
1920		
1921	*624,000	26,160
1922		
1923		
1925		
1926	*76,000	13,120
1927		
1928		
1931}	*	*
1932}		
Totals	2,113,690	\$85,025

* Annual details concealed under 'Unapportioned,' on account of a single producer.

GYPSUM

Bibliography: State Mineralogist Reports XIV, XV, XVII, XVIII, XXII, XXIII, XXV-XXVII (inc.). Bulletins 38, 67, 91. U. S. Geol. Surv., Bull. 223, 413, 430, 697. U. S. Bur. of Standards, Circular No. 281.

During the year 1932 there were shipments of gypsum in California amounting to 46,867 short tons valued at \$93,818, coming from two properties in Riverside County and a single property each in Fresno and Imperial counties. This was a decrease in both quantity and value from the 1931 output, which was 88,354 tons worth \$199,198.

Total Production of Gypsum in California.

Production of gypsum annually in California since such records have been compiled by this Bureau is as follows:

Year	Tons	Value	Year	Tons	Value
1887.....	2,700	\$27,000	1911.....	31,457	\$101,475
1888.....	2,500	25,000	1912.....	37,529	117,388
1889.....	3,000	30,000	1913.....	47,100	135,050
1890.....	3,000	30,000	1914.....	29,734	78,375
1891.....	2,000	20,000	1915.....	20,200	48,953
1892.....	2,000	20,000	1916.....	33,384	59,533
1893.....	1,620	14,280	1917.....	30,825	56,840
1894.....	2,446	24,584	1918.....	19,695	37,176
1895.....	5,158	51,014	1919.....	19,813	50,579
1896.....	1,310	12,580	1920.....	20,507	92,535
1897.....	2,200	19,250	1921.....	37,412	78,875
1898.....	3,100	23,600	1922.....	47,084	188,336
1899.....	3,663	14,950	1923.....	86,410	289,136
1900.....	2,522	10,088	1924.....	25,569	53,210
1901.....	3,875	38,750	1925.....	107,613	172,444
1902.....	10,200	53,500	1926.....	114,868	211,337
1903.....	6,914	46,441	1927.....	94,630	292,090
1904.....	8,350	56,592	1928.....	104,790	200,567
1905.....	12,859	54,500	1929.....	140,844	396,951
1906.....	21,000	69,000	1930.....	116,865	243,507
1907.....	8,900	57,700	1931.....	88,254	193,198
1908.....	34,600	155,400	1932.....	46,867	93,818
1909.....	30,700	138,176			
1910.....	45,294	129,152	Totals.....	1,521,452	\$4,318,930



Gypsum mine U. S. Gypsum Company, near Blythe, Riverside County.

Photo by Walter W. Bradley.

LIMESTONE

Bibliography: State Mineralogist Reports IV, XII–XV (inc.), XVII–XXVII (inc.). Bulletins 38, 91. Oregon Agr. College Extension Bulletin 305. Eng. and Min. Jour.-Press, Vol. 120, pp. 249–253.

'Industrial' limestone was produced by 21 operators in 10 counties in California during 1932 to the amount of 168,950 short tons valued at \$487,788 coming from four properties each in El Dorado and Santa Cruz counties; three each in San Bernardino and Santa Clara counties; two each in Fresno and Tuolumne counties; and a single property each in Alameda, San Benito, San Mateo, and Ventura. The above showed a decrease from the 1931 output which was 177,268 tons worth \$560,699.

The amount here given does not include the limestone used in the manufacture of cement nor for macadam and concrete, nor of lime for building purposes; but accounts for that utilized as a smelter and foundry flux, for glass and sugar making, and other special chemical and manufacturing processes. It also includes that utilized for fertilizers (agricultural 'lime'), 'roofing gravel,' paint and concrete filler, whiting for paint, putty, kalsomine, terrazzo, paving dust, chicken grit, carbon dioxide gas, 'paving compound,' facing dust for concrete pipe, also for rubber and magnesite mix. The material from Fresno and Ventura counties and one operator in San Bernardino county was marl; and that from Alameda, San Mateo and Santa Clara counties was shells, dredged from San Francisco Bay, all of which was ground and used for agricultural purposes and poultry grit. Of the total 'industrial' limestone produced in 1932, approximately 49,641 short tons worth \$177,773 were used for agricultural purposes and poultry grit.

Distribution of the 1932 output of limestone was as follows:

County	Tons	Value
El Dorado -----	105,094	\$270,241
San Bernardino ^a -----	8,619	23,717
Santa Clara -----	17,250	53,690
Santa Cruz -----	6,330	15,292
Alameda, ^b Fresno, ^a San Benito, San Mateo, ^b Tuolumne, and Ventura ^a * -----	31,657	124,848
Totals -----	168,950	\$487,788

* Combined to conceal the output of operators in each.

^a Includes marl.

^b Includes shells.

Limestone Production of California, by Years.

The following tabulation gives the amounts and value of 'industrial' limestone produced in California by years since 1894 when compilation of such records was begun by the State Mining Bureau. These tonnages consist principally of limestone utilized for flux, glass and sugar making, agricultural, chemical, and other special industrial purposes. That utilized in cement manufacture is not included:

Limestone Production of California, by Years

Year	Tons	Value	Year	Tons	Value
1894	15,420	\$19,275	1914	572,272	\$517,713
1895	71,355	71,690	1915	146,324	156,288
1896	68,184	71,112	1916	187,521	217,733
1897	36,796	38,556	1917	237,279	356,396
1898	27,686	24,548	1918	208,566	456,258
1899	30,769	29,185	1919	88,291	248,145
1900	32,791	31,532	1920	90,120	298,197
1901	76,937	99,445	1921	75,921	305,912
1902	71,422	90,524	1922	81,382	282,181
1903	125,919	163,988	1923	143,266	348,464
1904	40,207	87,207	1924	219,476	582,660
1905	192,749	323,325	1925	319,977	494,525
1906	80,262	162,827	1926	108,795	367,501
1907	230,985	406,041	1927	609,790	663,957
1908	273,890	297,264	1928	127,895	397,935
1909	337,676	419,921	1929	168,315	557,617
1910	684,635	581,208	1930	169,477	508,751
1911	516,398	452,790	1931	177,268	560,699
1912	613,375	570,248	1932	168,950	487,788
1913	301,918	274,455			
			Totals	7,822,259	\$12,012,861

LITHIA

Bibliography: State Mineralogist Reports II, IV, XIV, XXI. Bulletins 38, 67, 91.

Lithia mica, lepidolite (a silicate of lithium and others), utilized in the manufacture of artificial mineral water, fireworks, glass, etc., has been mined in San Diego County since 1899, except between 1905 and 1915, though there was none shipped in 1923, 1925, 1929-1932 (inc.). During 1930 there was a small amount of lepidolite mined in California, but none shipped. Some amblygonite, a lithium phosphate, is occasionally also obtained from pockets associated with the gem tourmalines.

Lithia mica total production in the state has been as follows:

Year	Tons	Value	Year	Tons	Value
1899	124	\$4,600	1920	10,046	\$153,502
1900	440	11,000	1921	*1,365	20,781
1901	1,100	27,500	1922		
1902	822	31,880	1923	109	2,269
1903	700	27,300	1924		
1904	641	25,000	1925	*550	13,900
1905	25	276	1926		
1906			1927		
1915	91	1,365	1928		
1916	71	1,065	1929		
1917	880	8,800			
1918	4,111	73,998	Totals	21,875	\$417,636
1919	800	14,400			

* Annual details concealed under 'Unapportioned.'

MICA

Bibliography: State Mineralogist Reports II, IV, XXVI, XXVII. Bulletins 38, 67, 91. U. S. Geol. Surv., Bull. 740; Min. Res. of U. S. Eng. & Min. Jour.-Press, Vol. 115, pp. 55-60, Jan. 13, 1923.

Sericite, a fine-grained variety of muscovite, has been produced continuously since 1929 in California. The 1932 output came from a single property in Imperial County. The annual details are concealed in the 'Unapportioned' item so as not to reveal production of the

operator. This type of material is used as a cheap grade of ground mica for roofing, as a refractory, foundry facing, and decorative material to imitate snow.

Production of mica in California has been as follows:

Year	Tons	Value
1902	50	\$2,500
1903	50	3,800
1904	50	3,000
1929		
1930)*	2,240	15,260
1931]		
1932	*	*
Totals	2,390	\$24,560

* Annual details concealed under 'Unapportioned.'

MINERAL PAINT

Bibliography: State Mineralogist Reports XII-XIX (inc.), XXI, XXII-XXVI (inc.). Bulletins 38, 91.

During 1932 there was no output of mineral paint material in California. This was the first year since the production of this material was first reported commercially in 1890 in this state that there were no shipments.

These materials have come from Alameda, Amador, Butte, Calaveras, Colusa, Los Angeles, Napa, Nevada, Placer, Riverside, Shasta, Sonoma, Stanislaus and Ventura counties. There are also other deposits that may have possible commercial value, but as yet there have been no commercial shipments from El Dorado, Imperial, Kern, Kings, Lake, Mendocino, San Diego, Siskiyou, Trinity and Yuba counties, in which they are found.

Mineral Paint Production of California, by Years.

The first recorded production of mineral paint materials in the state was in the year 1890. The output, showing annual amount and value since that time, is given herewith:

Year	Tons	Value	Year	Tons	Value
1890	40	\$480	1912	300	\$1,800
1891	22	880	1913	303	1,780
1892	25	750	1914	132	847
1893	590	26,795	1915	311	1,756
1894	610	14,140	1916	643	3,960
1895	750	8,425	1917	520	2,700
1896	395	5,540	1918	728	4,738
1897	578	8,165	1919	1,780	17,055
1898	653	9,698	1920	779	8,477
1899	1,704	20,294	1921	446	4,748
1900	529	3,993	1922	1,620	13,277
1901	325	875	1923	1,049	11,773
1902	589	1,533	1924	532	5,234
1903	2,370	3,720	1925	669	6,969
1904	270	1,985	1926	569	5,846
1905	754	4,025	1927)*		
1906	250	1,720	1928/)	919	9,592
1907	250	1,720	1929	467	2,820
1908	335	2,250	1930)*		
1909	305	2,325	1931/)	250	3,000
1910	200	2,040	1932		
1911	186	1,184	Totals	23,147	\$222,098

*Annual details concealed under 'Unapportioned.'

MINERAL WATER

Bibliography: State Mineralogist Reports VI, XII–XVIII (inc.), XXI–XXVII (inc.). U. S. G. S., Water Supply Paper 338. Min. Res., 1914, 1916. 'Mineral Springs and Health Resorts of California,' by Dr. Winslow Anderson, 1890. U. S. Dept. of Agr., Bur. of Chem., Bulletin 91.

A widespread production of mineral water is shown annually in California. These figures refer to mineral water actually bottled for sale, or for local consumption. Water from some of the springs having a special medicinal value brings a price many times higher than the average shown, while in some cases the water is used merely for drinking purposes and sells for a nominal figure. Health and pleasure resorts are located at many of the springs. The waters of some of the hot springs are not suitable for drinking, but are very efficacious for bathing. From a therapeutic standpoint, California is particularly rich in mineral springs.

Commercial production of mineral water in California during 1932 amounted to 19,031,224 gallons valued at \$1,495,988. This was an increase in total value with a decreased quantity as compared with the 1931 output, which was 26,164,331 gallons worth \$1,347,860. The 1932 output was distributed by counties as follows:

<i>Counties</i>	<i>Gallons</i>	<i>Value</i>
Lake -----	18,870	\$6,050
Los Angeles -----	8,011,766	938,652
Napa -----	33,011	12,293
Sonoma -----	15,864	4,123
Butte, Calaveras, Colusa, Contra Costa, Fresno, Marin, Orange, Placer, Riverside, San Bernardino, San Diego, San Francisco, San Luis Obispo, Santa Barbara, Santa Clara, and Siskiyou *	10,951,713	534,870
Totals -----	19,031,224	\$1,495,988

* Combined to conceal the output of a single operator in each.

The production above tabulated either came from springs or artesian wells, and was bottled, in part with artificial carbonation, but mostly natural, and sold for drinking purposes. A large part was used in the preparation of soft drinks with flavors.

Mineral Water Production of California, by Years.

Mineral water was bottled for sale, at the Napa Soda Springs, Napa County, as early as 1860, and at other springs in California, notably The Geysers, Sonoma County, also at early dates; but there are no figures available earlier than the year 1887. Amounts and values, annually, since that year are shown herewith:

Year	Gallons	Value	Year	Gallons	Value
1887	618,162	\$144,368	1911	2,637,669	\$590,654
1888	1,112,202	252,990	1912	2,497,794	529,384
1889	808,625	252,241	1913	2,350,792	599,748
1890	258,722	89,786	1914	2,443,572	476,169
1891	334,553	139,959	1915	2,274,267	467,738
1892	331,875	162,019	1916	2,273,817	410,112
1893	383,179	90,667	1917	1,942,020	340,566
1894	402,275	184,481	1918	1,808,791	375,650
1895	701,397	291,500	1919	2,233,842	340,117
1896	808,843	337,434	1920	2,391,791	421,643
1897	1,508,192	345,863	1921	3,446,278	367,476
1898	1,429,809	213,817	1922	4,276,346	486,424
1899	1,338,537	406,691	1923	5,487,276	616,919
1900	2,456,115	268,607	1924	8,159,211	818,726
1901	1,555,328	559,057	1925	12,115,072	1,230,455
1902	1,701,142	612,477	1926	14,074,877	1,171,550
1903	2,056,340	558,201	1927	16,644,423	1,487,183
1904	2,430,320	496,946	1928	25,049,002	1,304,969
1905	2,194,150	538,700	1929	27,032,083	2,040,615
1906	1,585,690	478,186	1930	37,354,111	2,870,663
1907	2,924,269	544,016	1931	26,164,331	1,347,860
1908	2,789,715	560,507	1932	19,031,224	1,495,988
1909	2,449,834	465,488			
1910	2,335,259	522,009	Totals	256,203,122	\$28,406,618

PHOSPHATES

Bibliography: State Mineralogist Report XXI. Bulletins 67, 91.

No commercial production of phosphates has been recorded from California, though occasional pockets of the lithium phosphate, amblygonite, Li (AlF) PO_4 , have been found associated with the gem tourmaline deposits in San Diego County. Such production has been classified under lithia.

PUMICE and VOLCANIC ASH

Bibliography: State Mineralogist Reports XII, XIV, XV, XVII, XVIII, XXII-XXVII (inc.). Bulletin 38. U. S. Bureau of Mines I. G. 6560. (See 'Tufa.')

The production of pumice and volcanic ash in California during the year 1932 amounted to 9,892 short tons valued at \$86,034, coming from three properties in Inyo County and one each in Fresno, Imperial, Kern, Madera, Mono, Napa, San Luis Obispo and Sonoma counties. The 1932 output showed a decrease from that of 1931, which was 11,711 tons with \$108,130.

The material from two of the deposits in Inyo County and from Imperial, Mono, and Napa counties was pumice and was used in acoustic plaster, light-weight aggregate in concrete, for abrasive purposes and for chicken-house litter. The product from one party in Inyo and that from Fresno, Kern, Madera, San Luis Obispo, and Sonoma counties was the volcanic ash or tuff variety and was employed in making soap, cleanser compounds, a large tonnage being utilized as a concrete filler in cement displacement, and in asphalt and as a carrier for dry agricultural sprays. The Kern County ash is going into the preparation of one of the popular and nationally advertised brands of cleanser compounds.

Pumice Production of California, by Years.

Commercial production of pumice in California was first reported to the State Mining Bureau in 1909, then not again until 1912, since which year there has been a small annual output, as indicated by the following table:

Year	Tons	Value	Year	Tons	Value
1909.....	50	\$500	1922.....	613	\$4,248
1910.....			1923.....	2,936	16,309
1911.....			1924.....	4,919	33,404
1912.....	100	2,500	1925.....	5,319	32,937
1913.....	3,590	4,500	1926.....	7,170	48,350
1914.....	50	1,000	1927.....	13,779	168,896
1915.....	380	6,400	1928.....	10,440	105,055
1916.....	1,246	18,092	1929.....	10,449	76,123
1917.....	525	5,295	1930.....	12,947	128,847
1918.....	2,114	28,669	1931.....	11,711	108,130
1919.....	2,388	43,657	1932.....	9,891	86,034
1920.....	1,537	25,890			
1921.....	406	6,310	Totals.....	102,560	\$951,146

PYRITES

Bibliography: State Mineralogist Reports XVIII, XIX, XXII, XXV, XXVI. Bulletins 38, 91. Min. and Sci. Press, Vol. 144, pp. 825, 840.

Shipments of pyrite were made in California during 1932 from a property in Alameda County. The annual details were placed in the 'Unapportioned' item to conceal the output of this single operator. The 1932 production was a decrease in both quantity and value from that of 1931, which was 25,402 tons worth \$131,174.

This material was mostly used in the manufacture of sulphuric acid for explosives and fertilizer. Some iron sulphate had been produced previously and was utilized directly in the preparation of an agricultural fertilizer and insecticide. The sulphur content ranged up to 50.8% S.

This does not include the large quantities of pyrite, chalcopyrite, and other sulphides which are otherwise treated for their valuable metal contents. Some sulphuric acid is annually made as a by-product in the course of roasting certain tonnages of Mother Lode auriferous concentrates while under treatment for their precious metal values.

Pyrites Production in California, by Years.

The total recorded pyrites production in California to date is as follows:

Year	Tons	Value	Year	Tons	Value
1898.....	6,000	\$30,000	1916.....	120,525	\$372,969
1899.....	5,400	28,620	1917.....	111,325	323,704
1900.....	3,612	21,133	1918.....	128,329	425,012
1901.....	4,578	18,429	1919.....	147,024	540,300
1902.....	17,525	60,306	1920.....	146,001	530,581
1903.....	24,311	94,000	1921.....	110,025	473,735
1904.....	15,043	62,992	1922.....	151,381	570,425
1905.....	15,503	63,958	1923.....	148,004	555,308
1906.....	46,689	145,895	1924.....	124,214	517,835
1907.....	82,270	251,774	1925.....	129,500	528,550
1908.....	107,081	610,335	1926.....	100,896	466,088
1909.....	457,867	1,389,802	1927.....	130,910	564,823
1910.....	42,621	179,862	1928.....	90,566	400,627
1911.....	51,225	182,954	1929.....	79,169	363,717
1912.....	69,872	203,470	1930.....	39,958	194,228
1913.....	79,000	218,537	1931.....	25,402	131,174
1914.....	79,267	230,058	1932.....	*	*
1915.....	92,462	293,148			
			Totals.....	2,985,585	\$11,044,399

* Annual details concealed under "Unapportioned".

SHALE OIL

Bibliography: State Mineralogist Report XIX. U. S. Geol. Surv., Bulletins 322, 729. U. S. Bur. of Mines, Bull. 210. Eng. and Min. Jour.-Press, Vol. 118, No. 8, pp. 290-292, Aug. 23, 1924. Chem. & Met. Eng., Vol. 32, No. 6, Feb., 1925. Min. Congress Jour., Dec., 1924.

Two plants on a more or less experimental scale have operated in California, with commercial production beginning in a small way in 1922. The product, in part, has been sold for utilization as a flotation oil in metallurgical work, and part has been consumed as fuel at the plants. There was no production reported for 1932.

Shale Oil Production of California, by Years

Year	Barrels	Value
1922{*}.....	4,333	\$44,262
1923{*}.....		
1924{*}.....	8,688	55,240
1925{*}.....		
1926{*}.....	8,819	9,998
1927{*}.....		
1928.....	----	----
Totals	21,840	\$109,500

* Annual details concealed under 'Unapportioned.'

SILICA (Sand and Quartz)

Bibliography: State Mineralogist Reports IX, XIV, XV, XVII, XVIII, XX-XXVII (inc.). Bulletins 38, 67, 91.

We combine these materials because of the overlapping roles of vein quartz which is mined for use in glass making and as an abrasive, and that of silica sand which, although mainly utilized in glass manufacture, also serves as an abrasive. Both varieties are also utilized to some extent in fire-brick manufacture.

We do not include under this heading such forms of silica as: quartzite, sandstone, flint, tripoli, diatomaceous earth, nor the gem forms of 'rock crystal,' amethyst, and opal. Each of these has various industrial uses, which are treated under their own designations.

The production of silica in California during 1932 amounted to 33,997 short tons valued at \$130,324 f.o.b. rail-shipping point, coming from two properties each in Riverside and San Diego counties and one each in Contra Costa, El Dorado, Inyo, and Monterey counties. The above was a decrease in both quantity and value as compared with the 1931 output which was 43,330 tons worth \$182,769. Of the 1932 output, 33,362 tons were glass sand and 635 tons were vein and boulder quartz.

The glass sand came from Contra Costa, Monterey, and part of that from Riverside counties. For making the higher grades of glass, a deposit in Contra Costa County is replacing some of the sand imported from Belgium. Belgium sand has displaced local material in the manufacture of sodium silicate ('water glass'). There are various deposits of quartz in California which could be utilized for glass making, but to date they have not been so used owing to the cost of grinding and the difficulty of preventing contamination by iron while grinding.

Silica sand has been produced in the following counties of the State: Alameda, Amador, Contra Costa, El Dorado, Imperial, Los Angeles, Mariposa, Mono, Monterey, Orange, Placer, Riverside, San Diego, San Joaquin and Tulare, the chief centers being Contra Costa, Amador, Monterey and Los Angeles counties. The industry is of limited importance, so far, because of the fact that much of the available material is not of a grade which will produce first-class colorless glass; for such, it must be essentially iron-free. Even a fractional per cent of iron imparts a green color to the glass.

The Tariff Act of June 21, 1930, placed a duty on sand, containing 95 per cent or more of *Silica* and not more than six-tenths of 1 per cent of oxide of iron and suitable for use in the manufacture of glass, of \$2 per ton.

Total Silica Production in California.

Total silica production in California since the inception of the industry, in 1899, is shown below, being mainly sand:

Year	Tons	Value	Year	Tons	Value
1899.....	3,000	\$3,500	1917.....	19,376	\$11,166
1900.....	2,200	2,200	1918.....	23,257	88,930
1901.....	5,000	16,250	1919.....	18,659	101,600
1902.....	4,500	12,225	1920.....	25,324	96,793
1903.....	7,725	7,525	1921.....	10,569	49,179
1904.....	10,004	12,276	1922.....	9,874	31,016
1905.....	9,257	8,121	1923.....	7,964	30,420
1906.....	9,750	13,375	1924.....	6,808	35,006
1907.....	11,065	8,178	1925.....	12,498	96,780
1908.....	9,255	22,045	1926.....	30,010	104,317
1909.....	12,259	25,517	1927.....	21,636	94,762
1910.....	19,221	18,265	1928.....	14,814	66,679
1911.....	8,620	8,672	1929.....	18,686	79,210
1912.....	13,075	15,404	1930.....	17,802	71,380
1913.....	18,618	21,899	1931.....	43,330	182,769
1914.....	28,538	22,688	1932.....	33,997	136,324
1915.....	28,904	34,322			
1916.....	20,880	48,908	Totals.....	539,478	\$1,596,701

SILLIMANITE-ANDALUSITE-CYANITE GROUP

Bibliography: State Mineralogist Reports XX, XXIII, XXIV, XXVII. Bulletins 67, 91. Dana's Mineralogy. U. S. Geol. Surv., Prof. Paper 110. U. S. Bureau of Mines, Inform. Circ. 6255. Eng. & Min. Jour.-Press, Vol. 120, pp. 91-94, 1925. Amer. Mineralogist, June, 1924.

Sillimanite and andalusite are both aluminum silicates (Al_2SiO_5), having the same composition and formula, but with slightly different physical characteristics. Though both crystallize in the orthorhombic system, their crystal habits are different. A massive deposit of andalusite, found in Dry Creek Canyon in the White Mountains of the Inyo Range, in Mono County, is being mined by the Champion Porcelain Company of Detroit, Michigan. The material is shipped East and utilized in the manufacture of porcelain for automobile spark plugs, for other high-tension electric insulators, laboratory ware and porcelain. Porcelain made from these minerals can be subjected to sudden and extreme changes in temperature without damage.

Cyanide is also an aluminum silicate (Al_2SiO_5), of the same chemical composition as andalusite and sillimanite, but crystallizing in the triclinic system. A deposit of cyanite is being mined in Imperial County, near Ogilby, and shipments made to a refractory plant in Los Angeles.

Dumortierite, though differing somewhat in composition from the above, being a basic aluminum silicate ($\text{HAl}_3\text{BSi}_3\text{O}_{20}$), has proved similar in behavior in ceramic work so that it is now being mixed with andalusite for electrical porcelains. A deposit of this mineral in Nevada is being mined for that purpose. Occurrences of massive dumortierite are known in Imperial and San Diego counties in this State and there may yet be some commercial possibilities for them.

Total Sillimanite Group Production of California, by Years

Year	Tons	Value
1922}		
1923}*-----	4,584	\$98,790
1924}		
1925}		
1926}*-----	4,810	203,000
1927}		
1928}*-----	4,276	76,000
1929}*-----	4,359	198,893
1930}		
1931}*-----	1,244	21,800
1932}		
Totals -----	19,273	\$598,483

* Annual details concealed under 'Unapportioned.'

SOAPSTONE and TALC

Bibliography: State Mineralogist Reports XII, XIV, XV, XVII-XXVII (inc.). Bulletins 38, 67, 91. U. S. Bur. of Mines, Bulletin 213. Rep. of Investigations, Serial No. 2253, May, 1921.

The total output of talc and soapstone in California during 1932 amounted to 10,690 short tons valued at \$122,880. This was a decrease in quantity with an increased value over the 1931 figures, which were 13,492 tons and \$109,940. Over 85 per cent of the product was high-grade talc from Inyo and San Bernardino counties, which material was

utilized mainly in toilet powders, paint, paper and rubber manufacture, and some in ceramics. The remainder was soapstone and came from Butte, El Dorado and Tuolumne counties.

The 'soapstone' grades were used mainly for roofing granules and as a filler in roofing paper, and part also in magnesite cement.

It is reported that California tale has replaced to some extent imported tale in the toilet trade on the basis of quality. The largest production of tale in the United States comes from Vermont and New York, and of massive soapstone from Virginia.

During 1932 imports of tale, steatite, etc., totaled 19,978 short tons valued at \$357,109, as compared with 23,548 tons worth \$436,798 during 1931, according to the United States Bureau of Foreign and Domestic Commerce.

The Tariff Act of 1930 places a duty on tale, steatite or soapstone and French chalk; crude or unground of one-fourth of one cent per pound.

Talc Production of California, by Years.

Production was intermittent in the state up to 1912; but there has been a material growth since 1916, as shown in the following table:

Year	Tons	Value	Year	Tons	Value
1893.....	400	\$17,750	1914.....	1,000	\$4,500
1894.....			1915.....	1,663	14,750
1895.....	25	375	1916.....	1,703	9,831
1896.....			1917.....	5,267	45,279
1897.....			1918.....	11,780	85,534
1898.....			1919.....	8,764	115,091
1899.....			1920.....	11,327	221,362
1900.....			1921.....	8,752	130,078
1901.....	10	119	1922.....	13,378	197,186
1902.....	14	288	1923.....	17,439	252,661
1903.....	219	10,124	1924.....	16,179	242,770
1904.....	228	2,315	1925.....	15,465	239,084
1905.....	300	3,000	1926.....	17,004	255,645
1906.....			1927.....	16,218	164,744
1907.....			1928.....	18,668	251,372
1908.....	3	48	1929.....	18,676	193,493
1909.....	33	280	1930.....	15,861	154,258
1910.....	740	7,260	1931.....	13,472	109,940
1911.....			1932.....	10,690	122,880
1912.....	1,750	7,350			
1913.....	1,350	6,150	Totals.....	228,358	\$2,865,517

STRONTIUM

Bibliography: State Mineralogist Report XXVI, XXVII. Bulletins 67, 91. U. S. G. S., Bull. 540; 660-I.

There has been no production of strontium minerals in California since 1918, though in that year both celestite (SrSO_4), and the carbonate, strontianite (SrCO_3) were shipped. The first recorded commercial output of strontium minerals in California was in 1916. The occurrence of the carbonate is particularly interesting and valuable, as it appears to be the only considerable deposit of commercial importance so far opened up in the United States. Shipments reported as averaging 80% SrCO_3 have been made. The deposit is associated with deposits of barite near Barstow, San Bernardino County. The carbonate has also been found in massive form near Shoshone, Inyo County. In addition to Imperial County, celestite is found near Calico and Ludlow, and in the Avawatz Mountains in San Bernardino County, but as yet undeveloped.

Production of strontium minerals in California, by years, has been as follows :

Year	Tons	Value
1916 -----	57	\$2,850
1917 -----	3,050	37,000
1918 -----	2,900	33,000
1919 -----		
Totals -----	6,007	\$72,850

SULPHUR

Bibliography: State Mineralogist Reports IV, XIII, XIV, XXV. Bulletins 38, 67, 91.

During 1932 there was a production of sulphur in California coming from Inyo County. This material was shipped mostly for experimental purposes and tests. The annual details are concealed in the 'Unapportioned' item, so as not to reveal the figures of a single operator. The 1932 production was in excess of the 1929-1931 output, which came from Colusa County, and was utilized in the manufacture of a fertilizer and for dusting for mildew. These were the commercial operations of mining sulphur. The last previous production was in 1923 and 1924 and came from Kern County. This mineral has been found to some extent in Colusa, Imperial, Inyo, Kern, Lake, Sonoma, Tehama, and Ventura counties.

Total Production of Sulphur in California.

Sulphur was produced at the famous Sulphur Bank mine in Lake County, during the years 1865-1868 (inc.) ; following which the property became more valuable for its quicksilver. The Elgin quicksilver mine, near Wilbur Springs, Colusa County, is a similar occurrence.

Production of sulphur in California to date:

Year	Tons	Value
1865 } -----		
1866 } * -----	941	\$53,500
1867 } -----		
1868 to 1922 -----	-----	-----
1923 } * -----	185	4,071
1924 } -----		
1925 to 1928 -----	-----	-----
1929 } -----		
1930 } * -----	265	9,025
1931 } -----		
1932 -----	*	*
Totals -----	1,391	\$66,596

* Annual details concealed under 'Unapportioned.'

CHAPTER SIX

SALINES

Bibliography: State Mineralogist Reports III, XIV, XV, XVII-XXVII (inc.). Bulletin 24. Spurr and Wormser. "Marketing of Minerals." "Non-Metallic Minerals," by R. B. Ladoo. See also under each substance.

Under this heading are included borax, common salt, soda, potash, and other alkaline salts. The first two have been produced in a number of localities in California, more or less regularly since the early sixties. Except for a single year's absence, soda has had a continuous production since 1894. Potash, magnesium chloride and sulphate, and calcium chloride have been added to the commercial list in recent years, and in 1926 joined by bromide, and in 1931 by iodine. The nitrates are still prospective.

Our main resources of salines are the lake beds of the desert regions of Imperial, Inyo, Kern, Los Angeles, San Bernardino, and San Luis Obispo counties, and the waters of the Pacific Ocean.

The total value of this group showed a decrease to \$6,135,440 in 1932 from the 1931 figures which were \$11,779,513. The 1931 output of these materials was the highest on record. The following table gives details for the years 1931 and 1932:

Substance	1931		1932		Increase + Decrease— Value
	Amount	Value	Amount	Value	
Borates.....	206,405 tons	\$5,753,037	179,356 tons	\$2,856,470	\$2,896,567—
Salt.....	330,951 tons	1,233,567	256,353 tons	918,480	315,087—
Soda.....	78,701 tons	1,217,811	58,017 tons	826,369	391,442—
Unapportioned.....		\$3,575,098		\$1,534,121	2,040,977—
Total values.....		\$11,779,513		\$6,135,440	—
Net decrease.....					\$5,644,073—

^a Includes bromine, calcium chloride, iodine, magnesium salts, and potash.

^b Includes bromine, calcium chloride, magnesium salts, and potash.

BORATES

Bibliography: State Mineralogist Reports III, X, XII-XV (inc.), XVII-XXIII (inc.), XXV-XXVII (inc.). Bulletins 24, 67, 91.

During 1932 there was produced in California a total of 202,950 tons of borate materials, compared with 203,755 tons for the year 1931. The material shipped during the year included the new sodium borates, kernite (rasorite), kramerite and some colemanite from Kern County; also crystallized borax prepared by evaporation of brines at Searles Lake in San Bernardino County and Owens Lake in Inyo County.

As the crude ore is not sold as such, but is almost entirely calcined before shipping to the refinery for conversion into the borax of commerce, and because of the fact that the material varied widely in boric

acid content, we have recalculated the tonnage to a basis of 40 per cent, A. B. A. This is approximately the average A. B. A. content of the colemanite material after calcining, and also of the crystallized borax obtained from evaporation of the lake brines.

Recalculated as above, the 1932 production totaled 179,356 short tons valued at \$2,856,470. This was a slight decrease in tonnage, but an increase in value over the 1931 output, which was 206,405 tons worth \$5,753,037.

The total amount of borates exported from the United States¹ during the year 1932 was 89,641 short tons valued at \$2,677,626, as compared with 86,938 tons worth \$3,358,609 in 1932.

Total Production of Borate Materials in California.

Borax was first discovered in California in the waters of Tuscan Springs in Tehama County, January 8, 1856. Borax Lake in Lake County was discovered in September of the same year by Dr. John A. Veach. This deposit was worked in 1864–1868, inclusive, and during that time produced 1,181,365 pounds of refined borax. The bulk of it was exported by sea, to New York. This was the first commercial output of this salt in the United States, and California is still today the leading American producer of borax, having been for many years the sole producer.

Production from the dry lake 'playa' deposits of Inyo and San Bernardino counties began in 1873; but it was not until 1887 that the borax industry was revolutionized by the discovery of the colemanite beds at Calico, in San Bernardino County, and later similar beds in Inyo and Los Angeles counties. The colemanite deposits of Ventura County were not worked extensively, owing to lack of transportation facilities. Some production of colemanite has been made from deposits opened up in Clarke County, Nevada. Colemanite was in turn, displaced by the discovery in 1926 of kernite (rasorite) a sodium borate, near Kramer in Kern County.

¹Monthly Summary of Foreign Commerce of the United States, Department of Commerce, Dec., 1932, Part 1.

The total production of borate materials in California is shown in the following table:

Total Production of Borate Materials in California

Year	Tons	Value	Year	Tons	Value
1864.....	12	\$9,478	1899.....	20,357	\$1,139,882
1865.....	126	94,099	1900.....	25,837	1,013,251
1866.....	201	132,538	1901.....	22,221	982,380
1867.....	220	156,137	1902.....	17,202	2,234,994
1868.....	32	22,384	1903.....	34,430	661,400
1869.....			1904.....	45,647	698,810
1870.....			1905.....	46,334	1,019,158
1871.....			1906.....	58,173	1,182,410
1872.....	140	89,600	1907.....	53,413	1,200,913
1873.....	515	255,440	1908.....	22,200	1,117,000
1874.....	915	259,427	1909.....	16,628	1,163,960
1875.....	1,168	289,080	1910.....	16,828	1,177,960
1876.....	1,437	312,537	1911.....	50,945	1,456,672
1877.....	993	193,705	1912.....	42,135	1,122,713
1878.....	373	66,257	1913.....	58,051	1,491,530
1879.....	364	65,443	1914.....	62,500	1,483,500
1880.....	609	149,245	1915.....	67,004	1,663,521
1881.....	690	189,750	1916.....	103,523	2,409,375
1882.....	732	201,300	1917.....	109,944	2,561,958
1883.....	900	265,500	1918.....	88,772	1,867,908
1884.....	1,019	198,705	1919.....	66,791	1,717,192
1885.....	942	155,430	1920.....	127,065	2,794,206
1886.....	1,285	173,475	1921.....	50,136	1,096,326
1887.....	1,015	116,689	1922.....	39,087	1,068,025
1888.....	1,405	196,636	1923.....	62,667	1,893,798
1889.....	965	145,473	1924.....	52,070	1,599,149
1890.....	3,201	480,152	1925.....	46,124	1,526,938
1891.....	4,267	640,000	1926.....	47,605	1,625,298
1892.....	5,525	838,787	1927.....	72,462	3,043,260
1893.....	3,955	593,292	1928.....	109,722	3,378,552
1894.....	5,770	807,807	1929.....	144,678	3,312,085
1895.....	5,959	595,900	1930.....	209,869	3,686,817
1896.....	6,754	675,400	1931.....	206,405	5,753,037
1897.....	8,000	1,080,000	1932.....	179,356	2,856,470
1898.....	8 300	1,153,000			
			Totals.....	2,443,970	\$73,603,114

¹ Refined borax. ² Recalculated to 40% 'anhydrous boric acid' equivalent beginning with 1922.

BROMINE

The first commercial production of bromine and bromine compounds was begun during 1926 by the California Chemical Corporation in its plant at Chula Vista, San Diego County, from salt works bittern waters. This same plant has been recovering magnesium ehloride for a number of years. Bromine is also now being made at a similar bittern-water plant at Newark, Alameda County. The total commercial production of bromine in California for 1926–1928 inclusive amounted to 158 short tons valued at \$120,480, while that for 1929–1931 amounted to 802 tons worth \$552,933. The 1932 output and annual details are concealed under the 'Unapportioned' item.

CALCIUM CHLORIDE

Bibliography: U. S. Geol. Surv., Min. Res. 1919, Pt. II. Engineering and Contracting, Roads and Streets, monthly issue, Feb. 6, 1924. 'How to Maintain Roads,' manual of instruction of Dow Chemical Company.

Calcium chloride is hydroscopic, that is, it has an affinity for water. This property is taken advantage of by utilizing this salt as a drying agent. During 1932 the production of calcium ehloride in California came from San Bernardino County from two plants. The annual

details are concealed under the 'Unapportioned' item to conceal the output of either operator.

Total Calcium Chloride Production in California.

Commercial production of calcium chloride in California was first reported to the State Mining Bureau in 1921, from two plants in San Bernardino County, being obtained as a by-product in the refining of salt from deposits in certain of the desert dry lakes. Total production in California is shown in the following tabulation:

Year	Tons	Value
1921.....	683	\$22,980
1922 }		
1923 }	1,204	26,580
1924 }		
1925 }	10,988	328,876
1926 }		
1927 }	34,195	508,748
1928 }		
1929 }	12,020	114,080
1930 }	9,688	103,237
1931 }	*	*
1932 }		
Totals.....	68,778	\$1,104,501

* Annual details concealed under 'Unapportioned.'

IODINE

Bibliography: U. S. Bureau of Mines I. C. 6387.

Iodine was first produced in California during 1917 to 1921 as a by-product of potash which was reduced from kelp in an experimental station of U. S. Department of Agriculture at Summerland, but after the armistice the demand for these minerals decreased so that the plants in Santa Barbara County closed. In 1929 the General Salt Company erected a plant which reduces iodine from the waste waters of certain deep oil wells in the Long Beach field. Their production is more or less in the experimental stage. Annual details are concealed under the 'Unapportioned' item so as not to reveal the output of a single operator. This plant was closed in 1932.

MAGNESIUM SALTS

Bibliography: State Mineralogist Reports XX, XXI, XXV-XXVI (inc.). Bulletin 91. 'Dictionary of Applied Chemistry,' by Thorpe. U. S. Geol. Surv., Min. Res. of P. S.

The 1932 production of magnesium salts in California is concealed under 'Unapportioned.' This was the chloride and the carbonate. The chloride was nearly all sold for use in magnesite stucco and cement mixtures (Sorel cement), also some for road liquor. The carbonate, a bulky white powder, was used as a heat-insulating material, as a filler for rubber, paper, paint, etc., and in medicines, in tooth paste, in face powder and as a polish for metal and glass. The sulphate marketed was utilized for medicinal and bath purposes. The material coming from San Diego County was residual bitterns from the salt plants and was in part marketed in the liquid form carrying from

35 per cent to 67 per cent $MgCl_2$ and in part as dry crystals, while that from San Mateo County was magnesium carbonate.

The average value reported for the chloride produced in California in 1932 was approximately \$30 per ton, f.o.b. plant.

Total Production of Magnesium Salts in California.

Commercial production of magnesium chloride in California was begun in 1916 by some of the salt companies, from the residual bitterns obtained during the evaporation of sea water for its sodium chloride. In addition, some magnesium sulphate, or 'epsom salts' is also made, annually, but in smaller amount, and magnesium carbonate by a patented process, direct from sea water.

The total production of magnesium salts in California, since the beginning of the industry here, is shown in the following tabulation:

Year	Tons	Value
1916.....	851	\$6,407
1917.....	1,064	34,973
1918.....	1,008	29,955
1919.....	1,616	82,457
1920.....	3,150	107,787
1921.....	4,153	106,140
1922.....	3,036	89,788
1923.....	3,662	116,031
1924.....	4,823	145,883
1925.....	4,221	132,553
1926.....	4,881	124,470
1927)*.....	6,241	139,589
1928)*.....		
1929)*.....	4,914	333,906
1930)*.....		
1931)*.....	2,749	217,979
1932)*.....		
Totals.....	46,369	\$1,667,918

* Annual details concealed under 'Unapportioned.'

NITRATES

Bibliography: State Mineralogist Reports XV, XXV, XXVI, XXVII. Bulletins 24, 67, 91. U. S. G. S., Press Bulletin No. 373, July, 1918. Smithsonian Inst., Publ. No. 2421, 1916.

Nitrates of sodium, potassium and calcium have been found in various places in the desert regions of the state, but no deposit of commercial value has been developed as yet. It is hoped that a closer search may some day be rewarded by workable discoveries. At present the principal commercial source of nitrates is the Chilean saltpeter (sodium nitrate) deposits in South America.

The fixation of atmospheric nitrogen electrically has been accomplished successfully in Germany and Scandinavia. The possibilities of cheap hydro-electric power in California make the subject one of interest to us, as we have also the natural raw materials and chemicals to go with the power. Sodium and potassium cyanides can be made by fixation of atmospheric nitrogen electrically.

POTASH

Bibliography: State Mineralogist Reports XV, XVIII, XX, XXII, XXV, XXVII (inc.). Bulletins 24, 67, 91. U. S. G. S., Min. Res. 1913, 1914, 1915. Senate Doc. No. 190, 62 Congress, 2d Session. Mining & Sci. Press, Vol. 112, p. 155; Vol. 114, p. 789. Eng. & Min. Jour.-Press, Vol. 117, p. 557, Apr. 5, 1924.

The 1932 production of potash in California came from a single operator in San Bernardino County, the details of which are concealed under the 'Unapportioned' item. This was principally chloride and the product averaged 60% equivalent K_2O content. The material was sold mainly for fertilizer manufacture.

Imports of crude potash minerals and salts into the United States during 1932, according to the U. S. Bureau of Foreign and Domestic Commerce, amounted to 256,730 long tons valued at \$5,708,588, compared with 472,626 long tons worth \$12,237,226 in 1930. These materials consisted mainly of 'manure salts,' crude chloride (muriate) and sulphate, and kainite, all of which are admitted duty free.

Quotations have recently ranged from \$48.25 per ton c.i.f. Atlantic and Gulf ports for high-grade sulphate (90%–95%), \$35 per ton for muriate (80%–85%), and \$19 for manure salts (30%).

Total Production of Potash in California.

Potash production began commercially in California in 1914, with a small yield from kelp. The bulk of the output comes from deposits of potash-bearing residues and brines in the old lake beds of the desert regions, particularly Searles Lake, San Bernardino County. A small amount has been made from salt-works bitterns, and for a time there was some from Portland cement dust. Some also has been obtained from molasses distillery-slops char.

The annual amounts and value of these potash materials, since their beginning in California in 1914, have been as follows:

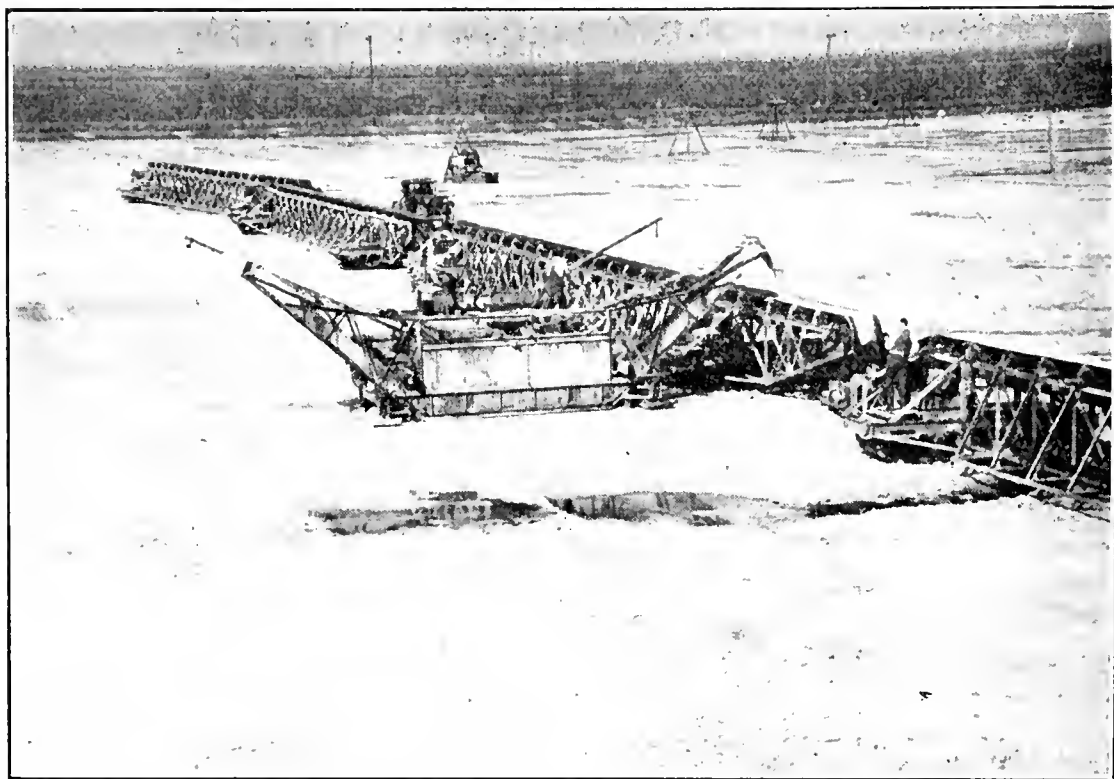
Year	Tons	Value
1914.....	10	\$460
1915.....	1,076	19,391
1916.....	17,908	663,605
1917.....	129,022	4,202,889
1918.....	49,381	6,808,976
1919.....	28,118	2,415,963
1920.....	26,298	1,465,463
1921.....	14,806	390,210
1922.....	17,776	584,388
1923.....	29,597	709,836
1924.....	33,107	747,407
1925.....	36,355	829,770
1926.....	32,884	812,285
1927.....	67,340	1,952,852
1928} *		
1929}	178,680	5,522,350
1930} *		
1931}	172,263	5,500,536
1932.....	*	*
Totals.....	834,621	\$32,632,381

*Annual details concealed under 'Unapportioned.'

SALT

Bibliography: State Mineralogist Reports II, XII–XV (inc.), XVII–XXIII (inc.), XXV–XXVII. Bulletins 24, 67, 91. U. S. Geol. Survey, Bull. 669. U. S. Bur. of Mines, Bull. 146.

Most of the salt production in California is obtained by evaporation of water of the Pacific Ocean, plants being located on the shores of San Francisco, Monterey, and San Diego bays, and at Long Beach. Additional amounts are derived from lakes and lake beds in the desert regions (in part, rock salt), mainly in Inyo, Kern, and San Bernardino counties, and evaporation of alkaline lake water in Modoc County. A small amount of valuable medicinal salts has been obtained by evaporation of the water of Lake Mono, Mono County.



Salt harvester loading salt on conveyor belt at Alviso, Santa Clara County.

Photo by courtesy of Alviso Salt Co.

During 1932 in California there was an output of 256,353 short tons of salt worth \$918,480, compared with 330,951 tons worth \$1,233,567 in 1931. There were ten plants operating in 1932, two each in Alameda and San Bernardino counties, and one each in Kern, Los Angeles, Modoc, Monterey, San Diego, and San Mateo counties.

The average value reported for salt produced in California during 1932 was \$3.58 per ton f.o.b. plant, as compared with \$3.73 in 1931, \$3.36 in 1930, \$6.80 in 1929 and \$3 in 1928.

Production of Salt in California, by Years.

Amount and value of annual production of salt in California from 1887 is shown in the following tabulation:

Year	Tons	Value	Year	Tons	Value
1887.....	28,000	\$112,000	1910.....	174,920	\$395,417
1888.....	30,800	92,400	1911.....	173,332	324,255
1889.....	21,000	63,000	1912.....	185,721	383,370
1890.....	8,729	57,085	1913.....	204,407	462,681
1891.....	20,094	90,303	1914.....	223,806	583,553
1892.....	23,570	104,788	1915.....	169,028	368,737
1893.....	50,500	213,000	1916.....	186,148	455,695
1894.....	49,131	140,087	1917.....	227,825	584,373
1895.....	53,031	150,576	1918.....	212,076	806,328
1896.....	64,743	153,244	1919.....	233,994	896,963
1897.....	67,851	157,520	1920.....	230,638	972,648
1898.....	93,421	170,855	1921.....	197,989	832,702
1899.....	82,654	149,588	1922.....	223,238	819,187
1900.....	89,338	204,754	1923.....	275,979	1,130,670
1901.....	126,218	366,376	1924.....	318,800	1,159,137
1902.....	115,208	205,876	1925.....	284,068	949,826
1903.....	102,895	211,365	1926.....	311,761	1,124,978
1904.....	95,968	187,300	1927.....	263,028	639,127
1905.....	77,118	141,925	1928.....	340,580	1,024,656
1906.....	101,650	213,228	1929.....	392,039	2,665,436
1907.....	88,063	310,967	1930.....	347,945	1,167,487
1908.....	121,764	281,469	1931.....	330,951	1,233,567
1909.....	155,680	414,708	1932.....	256,353	918,480
			Totals.....	7,431,052	\$24,091,687

SODA

Bibliography: State Mineralogist Reports XII, XIII, XV, XVII, XVIII, XXX, XXII, XXIII, XXV-XXVII (inc.). Bulletins 24, 67, 91. U. S. Geol. Surv., Bull. 717.

The production of sodium salts in California in 1932 included: Soda ash, trona, caustic soda and bicarbonate from plants at Owens Lake, Inyo County, and trona ('sesqui-carbonate,' a double salt of Na_2CO_3 and Na_2CO_3 and NaHCO_3) from Searles Lake, San Bernardino County. There were no shipments of salt cake (sulphate) from the Carrizo Plains, San Luis Obispo County, in 1932. The output of the year amounted to 58,017 short tons valued at \$826,369, compared with the 1931 figures of 78,701 tons and \$1,217,811.

The dense ash and bicarbonate were used mainly in the manufacture of soap, glass, paper, oil refining, sugar refining, and chemicals; and the trona for metallurgical purposes.

Soda Production of California, by Years.

The total output, showing amount and value of these materials in California since the inception of the statistical records of the State Mining Bureau, is given in the table which follows:

Year	Tons	Value	Year	Tons	Value
1894	1,530	\$20,000	1914	6,522	\$115,396
1895	1,900	47,500	1915	5,799	83,485
1896	3,000	65,000	1916	10,593	264,825
1897	5,000	110,000	1917	24,505	928,578
1898	7,000	154,000	1918	20,447	855,423
1899	10,000	250,000	1919	21,294	721,958
1900	1,000	50,000	1920	32,407	1,164,898
1901	8,000	100,000	1921	14,828	438,996
1902	7,000	50,000	1922	20,084	573,661
1903	18,000	27,000	1923	34,885	764,284
1904	12,000	18,000	1924	32,536	711,796
1905	15,000	22,500	1925	48,625	947,649
1906	12,000	18,000	1926	63,333	1,305,802
1907			1927	62,571	1,478,239
1908	9,600	14,400	1928	80,838	1,469,297
1909	7,712	11,593	1929	90,646	1,838,657
1910	8,125	11,862	1930	90,122	1,627,344
1911	9,023	52,887	1931	78,701	1,217,811
1912	7,200	37,094	1932	58,017	826,369
1913	1,861	24,936			
			Totals	1,041,704	\$18,719,240

CHAPTER SEVEN

BY COUNTIES

Introductory.

The State of California includes a total area of 158,297 square miles, of which 155,652 square miles are of land. The maximum width is 235 miles, the minimum 148 miles, and the length from the northwest corner to the southeast corner is 775 miles. The State is divided into fifty-eight counties. The 1930 census figures show a total population for California of 5,672,009. Minerals of commercial value exist in every county, and during 1932 some active production was reported to the State Division of Mines from all of the fifty-eight, with one exception.

Rank of Counties in Mineral Yield, 1931.

Of the ten leading counties in point of total value of output for 1932, the first six, Los Angeles, Kern, Kings, Ventura, Orange, and Santa Barbara, also Fresno (eighth) owe their position to petroleum and natural gas. Los Angeles, due to crude oil, leads all other counties, being credited with 38 per cent of the State's total value in 1932, having passed Kern in 1923, which led the State for many years. San Bernardino (seventh) owes its place to cement, potash, and borates; Nevada (ninth) and Sacramento (tenth) to gold.

There were sixteen counties each having a mineral production in excess of a million dollars in 1932. Petroleum was an important item in seven; natural gas in six; gold and cement in three each; miscellaneous stone in two; borates and potash in one each. In point of variety and diversity, San Bernardino County led all others in 1932 with a total of twenty-one different mineral products on the commercial list, followed by Inyo with seventeen; Kern, and San Diego, sixteen each; Fresno and Los Angeles, fifteen each; Riverside, fourteen; El Dorado, Santa Barbara, and Tulare, twelve each; Calaveras, Monterey, and Ventura, eleven each; Alameda, Amador, Santa Clara, and Tuolumne, ten each.

<i>County</i>	<i>Value</i>	<i>County</i>	<i>Value</i>
1. Los Angeles -----	\$76,721,115	31. Madera -----	\$298,021
2. Kern -----	28,069,925	32. San Joaquin -----	270,492
3. Kings -----	22,720,986	33. Marin -----	253,837
4. Ventura -----	14,855,606	34. Imperial -----	251,727
5. Orange -----	14,182,245	35. San Luis Obispo -----	249,930
6. Santa Barbara -----	7,583,197	36. Placer -----	240,248
7. San Bernardino -----	6,043,335	37. San Benito -----	199,924
8. Fresno -----	3,744,391	38. Siskiyou -----	184,019
9. Nevada -----	3,704,103	39. Plumas -----	181,312
10. Sacramento -----	2,339,923	40. Napa -----	169,633
11. Alameda -----	1,765,139	41. Sonoma -----	167,849
12. Riverside -----	1,681,855	42. Monterey -----	166,297
13. Amador -----	1,400,286	43. Mono -----	135,680
14. San Mateo -----	1,343,450	44. Humboldt -----	117,475
15. Santa Cruz -----	1,047,766	45. Tulare -----	116,074
16. Contra Costa -----	1,013,993	46. Lassen -----	109,568
17. Yuba -----	989,149	47. Mendocino -----	101,669
18. Merced -----	749,742	48. Lake -----	97,084
19. Calaveras -----	735,199	49. Modoc -----	51,002
20. Inyo -----	724,023	50. Colusa -----	38,053
21. Shasta -----	610,986	51. Solano -----	36,202
22. Sierra -----	607,872	52. Del Norte -----	25,801
23. El Dorado -----	549,902	53. Yolo -----	21,625
24. Butte -----	464,512	54. Tehama -----	14,387
25. Mariposa -----	379,254	55. Glenn -----	8,714
26. San Diego -----	375,176	56. San Francisco -----	3,903
27. Stanislaus -----	333,482	57. Alpine -----	1,995
28. Trinity -----	325,275	58. Sutter -----	---
29. Santa Clara -----	321,627		
30. Tuolumne -----	300,458	Total -----	\$199,196,493

ALAMEDA

Land area: 732 square miles.

Population: 475,153 (1930 census).

Location: East side of San Francisco Bay.

County seat: Oakland.

References: State Mineralogist Report XVII: XVIII: XX: XXVI (Oct. 1929).

Alameda County, while in no sense one of the 'mining counties,' came eleventh on the list of counties as to value, with a mineral production for 1932 worth \$1,765,139, and having ten different substances. This was a decrease from the 1931 output, which was valued at \$2,417,925.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Brick and hollow building tile-----	-----	\$161,001
Clay (pottery)-----	7,333 tons	4,887
Copper-----	12,545 lbs.	790
Silver-----	49 fine oz.	14
Stone, miscellaneous-----	-----	813,165
Other minerals *-----	-----	785,282
Total value -----	-----	\$1,765,139

* Includes limestone (shells), pyrite, and salt.

ALPINE

Land area: 776 square miles.

Population: 236 (1930 census).

Location: On eastern border of state, south of Lake Tahoe.

County seat: Markleeville.

References: State Mineralogist Report XV: XVII: XVIII.

Alpine County ranked fifty-seventh in value of output for 1932, which was \$1,995, compared with \$29 in 1931.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	---	\$647
Silver-----	847 fine oz.	241
Stone, miscellaneous-----	---	1,100
Unapportioned-----	---	7
Total value -----	-----	\$1,995

AMADOR

Land area: 601 square miles.

Population: 8494 (1930 census).

Location: East-central part of state—Mother Lode District.

County seat: Jackson.

References: State Mineralogist Report XIV: XVII: XVIII: XIX: XX: XXIII (April, 1927).

Amador County ranked thirteenth as to value of mineral output for 1932, with ten different minerals worth \$1,400,286, compared with \$2,170,075 for 1931. The decrease was due mainly to gold.

Amador at one time led the state in gold production, though exceeded in 1920-1923 and in 1926-1927 by Yuba and Nevada counties, but in 1925 and 1928 by Yuba only, in 1929-1930 by Nevada only, and in 1931-1932 by Nevada and Sacramento.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Clay (pottery)-----	20,284 tons	\$26,373
Copper-----	1,454 lbs.	92
Gold-----	-----	1,307,760
Lead-----	2,981 lbs.	89
Silver-----	13,706 fine oz.	3,865
Stone, miscellaneous-----	-----	19,626
Other minerals *-----	-----	42,481
Total value -----	-----	\$1,400,286

* Includes brick, coal, marble.

BUTTE

Land area: 1722 square miles.

Population: 34,010 (1930 census).

Location: North-central portion of state.

County seat: Oroville.

References: State Mineralogist Report XV: XVII: XVIII: XXIV
(July, 1928): XXVI (Oct., 1930).

Butte County ranks twenty-fourth in California as regards to value of mineral output in 1932, with eleven mineral substances having a total value of \$464,512 as compared with \$482,737 in 1931.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Copper-----	715 lbs.	\$45
Gold-----	-----	265,589
Silver-----	2,543 fine oz.	717
Stone, miscellaneous-----	-----	191,487
Other minerals *-----	-----	6,674
Total value -----	-----	\$464,512

* Includes gems (diamonds), lead, mineral water, natural gas, platinum, soapstone.

CALAVERAS

Land area: 1027 square miles.

Population: 6,009 (1930 census).

Location: East-central portion of state—Mother Lode District.

County seat: San Andreas.

References: State Mineralogist Report XIV: XVII: XVIII: XIX:
XX: XXI (April, 1925).

Calaveras County ranked nineteenth in California in regard to value of mineral output in 1932 with nine different mineral substances valued at \$735,199, compared with \$1,093,554 in 1931. The decrease was due to cement.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$186,378
Lead-----	642 lbs.	19
Silver-----	2,706 fine oz.	763
Stone, miscellaneous-----	-----	49,254
Other minerals *-----	-----	498,785
Total value -----	-----	\$735,199

* Includes cement, pottery clay, gems (quartz crystals), copper, mineral water,

COLUSA

Land area: 1140 square miles.

Population: 10,257 (1930 census).

Location: Sacramento Valley.

County seat: Colusa.

References: State Mineralogist Report XIV: XVII: XVIII: XXV (April, 1929).

Colusa County ranks fiftieth in regard to value of mineral output in 1932 with six different mineral substances worth \$38,053 compared with \$118,905 in 1931.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	----	\$371
Silver-----	4 fine oz.	1
Stone, miscellaneous-----	----	23,858
Other minerals *-----	----	13,823
Total value -----		\$38,053

* Includes mineral water and quicksilver.

CONTRA COSTA

Land area: 714 square miles.

Population: 78,554 (1930 census).

Location: East side of San Francisco Bay.

County seat: Martinez.

References: State Mineralogist Report XVII: XVIII: XXIII (Jan., 1927).

Contra Costa County stands sixteenth on the list in respect to value of mineral output for 1932, with eight different substances worth \$1,013,993, as compared with \$1,328,812 in 1931. The decrease was due mainly to cement.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Value</i>
Stone, miscellaneous -----	\$231,590
Other minerals *-----	782,403
Total value -----	\$1,013,993

* Includes brick and hollow building tile, cement, clay (pottery), mineral water, quicksilver, silica (glass sand).

DEL NORTE

Land area: 1024 square miles.

Population: 4734 (1930 census).

Location: Extreme northwest corner of state.

References: State Mineralogist Report XIV: XVII: XXI (July, 1925).

Del Norte County in fifty-second place as a mineral producing county for 1932, with five different substances worth \$25,801, as compared with \$38,075 in 1931.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	----	\$2,195
Silver-----	8 fine oz.	2
Stone, miscellaneous-----	----	23,416
Unapportioned-----	----	188
Total value -----		\$25,801

EL DORADO

Land area: 1753 square miles.

Population: 8303 (1930 census).

Location: East-central portion of the state, northernmost of the Mother Lode counties.

County seat: Placerville.

References: State Mineralogist Report XV: XVII: XVIII: XIX: XX: XXII (Oct., 1926).

El Dorado County, which contains the location where gold in California was first heralded to the world, comes twenty-third on the list of counties ranked according to value for 1932, with twelve different substances worth \$549,902. In addition to the segregated figures here given, a large tonnage of limestone is annually shipped for use in cement manufacture, the value being included in the state's total for cement. The 1931 output was valued at \$437,935.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Copper-----	850 lbs.	\$54
Gold-----	-----	182,043
Limestone-----	105,094 tons	207,241
Silver-----	1,554 fine oz.	438
Other minerals *-----	-----	97,126
Total value-----	-----	\$549,902

* Includes lead, lime, platinum, silica (quartz), slate, soapstone, miscellaneous stone, tungsten ore.

FRESNO

Land area: 5950 square miles.

Population: 144,369 (1930 census).

Location: South-central portion of state.

County seat: Fresno.

References: State Mineralogist Report XIV: XVII: XVIII: XXV (July, 1929).

Fresno County, eighth in importance as a mineral producer among the counties of California, reports an output for 1932 of fifteen different mineral substances, with a total value of \$3,744,391, as compared with the 1931 value of \$2,238,333.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$12,445
Natural gas-----	25,476,752 M cu. ft	1,520,285
Petroleum-----	3,665,641 bbls.	2,038,096
Silver-----	114 fine oz.	32
Stone, miscellaneous-----	-----	116,494
Other minerals *-----	-----	57,039
Total value-----	-----	\$3,744,391

* Includes brick and hollow building tile, diatomite, gems (topaz, tourmaline), granite, gypsum, limestone (marl), mineral water, volcanic ash, quicksilver.

GLENN

Land area: 1259 square miles.

Population: 10,935 (1930 census).

Location: West side of Sacramento Valley.

County seat: Willows.

References: State Mineralogist Report XIV: XVII: XVIII.

Glenn County stands fifty-fifth as a mineral producing county of the state for 1932 and owes its position mainly to the presence of large deposits of sand and gravel, much of which is used as railroad ballast.

Commercial production for 1932 was as follows, being a decrease from \$47,462 for the previous year:

<i>Substance</i>	<i>Value</i>
Stone, miscellaneous -----	\$8,714

HUMBOLDT

Land area: 3634 square miles.

Population: 43,189 (1930 census).

Location: Northwestern portion of state, bordering on Pacific Ocean.

County seat: Eureka.

References: State Mineralogist Report XIV: XVII: XVIII: XXI (July, 1925).

Humboldt County ranks forty-fourth in the value of its mineral output among the counties of the state for 1932, with eight different mineral substances valued at \$117,475, compared with the 1931 output worth \$199,986.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$2,549
Silver-----	15 fine oz.	4
Stone, miscellaneous-----	-----	112,877
Other minerals *-----	-----	2,045
Total value -----		\$117,475

* Includes brick, clay (pottery), natural gas, platinum.

IMPERIAL

Land area: 4089 square miles.

Population: 60,894 (1930 census).

Location: Extreme southeast corner of the state.

County seat: El Centro.

References: State Mineralogist Report XIV: XVII: XVIII: XIX: XX: XXII (April, 1926).

Imperial County ranked thirty-fourth in total value of mineral output for 1932, with nine different mineral substances valued at \$251,727, compared with \$528,072 for 1931.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$16,212
Silver-----	530 fine oz.	149
Stone, miscellaneous-----	-----	171,694
Other minerals *-----	-----	63,672
Total value -----		\$251,727

* Includes clay (pottery), gypsum, mica (sericite), pumice, cyanite.

INYO

Land area: 10,019 square miles.

Population: 6557 (1930 census).

Location: Lies on eastern border of state, north of San Bernardino County.

County seat: Independence.

References: State Mineralogist Report XV: XVII: XVIII: XX: XXII (Oct., 1926).

Inyo County mineral output for 1932 reached a value of \$724,025, having seventeen different mineral substances, and standing twentieth among the counties of the state as to value of production. The 1931 output was worth \$1,347,708.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Copper-----	12,672 lbs.	\$798
Gold-----	-----	42,113
Lead-----	2,204,108 lbs.	66,123
Pumice and volcanic ash-----	431 tons	4,845
Silver-----	85,376 fine oz.	24,105
Stone, miscellaneous-----	-----	5,800
Other minerals *-----	-----	580,239
Total value -----	-----	\$724,025

* Includes bentonite, borates, dolomite, feldspar, quicksilver, silica (quartz), slate, talc, soda, sulphur.

KERN

Land area: 8003 square miles.

Population: 82,219 (1930 census).

Location: South-central portion of state.

County seat: Bakersfield.

References: State Mineralogist Report XIV: XVII: XVIII: XXIX: XX: XXV (Jan., 1929).

Kern County, because of its immensely productive oil fields, for many years stood preeminent among all counties of California in the value of its mineral output. It was surpassed by Los Angeles and Orange counties in 1923, but by Los Angeles only in 1924-1932, for which petroleum is responsible. The 1932 production consisted of sixteen different mineral substances valued at \$28,069,925, compared with 1931 output worth \$28,782,358.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Clay (pottery and oil well drilling mud)-----	14,770 tons	\$22,871
Gold-----	-----	296,250
Natural gas-----	26,234,262 M cu. ft.	1,201,293
Petroleum-----	35,552,561 bbls.	23,393,585
Silver-----	14,033 fine oz.	3,957
Stone, miscellaneous-----	-----	49,077
Other minerals *-----	-----	3,102,892
Total value -----	-----	\$28,069,925

* Includes bentonite, borates, brick, cement, copper, lead, volcanic ash, salt.

KINGS

Land area: 1559 square miles.

Population: 25,277 (1930 census).

Location: South-central portion of the state.

County seat: Hanford.

References: State Mineralogist Report XIV: XVII: XVIII: XXVI (Oct., 1930).

Kings County advanced from ninth position in 1929 to seventh in value of mineral production for 1930, and third for 1931-1932, accounted for by the bringing in of further oil wells at Kettleman Hills, which began commercial yield in 1928.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Natural gas-----	92,279,724 M cu. ft	\$4,322,190
Petroleum-----	21,981,835 bbls.	18,398,796
Total value -----		\$22,790,986

LAKE

Land area: 1278 square miles.

Population: 7166 (1930 census).

Location: About fifty miles north of San Francisco Bay and the same distance inland from the Pacific Ocean.

County seat: Lakeport.

References: State Mineralogist Report XIV: XVII: XVIII: XX: XXV (July, 1929).

Lake County in forty-eighth place as to value of mineral output for 1932, with five different mineral substances worth \$97,084, as compared with \$280,768 for 1931. The decrease was mainly due to quicksilver.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Mineral water-----	18,870 gals.	\$6,050
Quicksilver-----	1,038 flasks	57,850
Stone, miscellaneous-----	----	33,164
Unapportioned-----	----	20
Total value -----		\$97,084

LASSEN

Land area: 4531 square miles.

Population: 12,587 (1930 census).

Location: Northeast portion of state.

County seat: Susanville.

References: State Mineralogist Report XV: XVII: XVIII: XIX: XXV (Jan., 1929).

Lassen County in forty-sixth place as to mineral production for 1932 was as follows, being an increase over \$1,843 value for the previous year:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	----	\$460
Silver-----	12 fine oz.	3
Stone, miscellaneous-----	----	109,105
Total value -----		\$109,568

LOS ANGELES

Land area: 4067 square miles.

Population: 2,201,526 (1930 census).

Location: One of the southwestern coast counties.

County seat: Los Angeles.

References: State Mineralogist Report XV: XVII: XVIII: XIX: XX: XXIII (July, 1927).

The mineral production for Los Angeles County for the year 1932 amounted in value to \$76,721,115, as compared with 1931 output, worth \$79,469,897. This accounted for 38 per cent of the entire state's total for 1932 and ranks Los Angeles first in the state as a mineral producer, having in 1923 passed Kern County, which had previously been leading for several years.

Commercial production for 1932, consisting of fifteen substances, was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Brick-----	58,099 M	\$747,301
Hollow building tile-----	6,937 tons	54,740
Clay (pottery)-----	38,452 tons	21,978
Gold-----	-----	6,691
Mineral water-----	8,011,766 gals.	938,652
Natural gas-----	83,699,705 M cu. ft.	5,379,497
Petroleum-----	78,361,176 bbls.	67,390,611
Silver-----	47 fine oz.	13
Stone, miscellaneous-----	-----	1,990,053
Other minerals *-----	-----	191,579
Total value -----		\$76,721,115

* Includes diatomite, lead, graphite, salt, sandstone (flagstone).

MADERA

Land area: 2112 square miles.

Population: 17,152 (1930 census).

Location: East-central portion of state.

County seat: Madera.

References: State Mineralogist Report XIV: XVII: XVIII: XXIV (Oct., 1928).

Madera County in thirty-first place as a mineral producer for 1932, with an output of five different substances valued at \$298,021, compared with \$488,343 for 1931. The decrease was due to granite.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$9,230
Silver-----	184 fine oz.	52
Other minerals *-----	-----	288,739
Total value -----		\$298,021

* Includes granite and miscellaneous stone.

MARIN

Land area: 529 square miles.

Population: 41,635 (1930 census).

Location: Adjoins San Francisco on the north.

County seat: San Rafael.

References: State Mineralogist Report XIV: XVII: XVIII: XXII (July, 1926).

Marin County in thirty-third place as to value of mineral output for 1932, with four substances, commercial production was as follows:

<i>Substance</i>	<i>Value</i>
Stone, miscellaneous -----	\$189,937
Other minerals * -----	63,900
Total value -----	\$253,837

* Includes brick and mineral water.

MARIPOSA

Land area: 1453 square miles.

Population: 2530 (1930 census).

Location: Most southerly of the Mother Lode counties. East-central portion of State.

County seat: Mariposa.

References: State Mineralogist Report XIV: XVII: XVIII: XIX (April, 1928).

Mariposa County is one of the distinctly "mining" counties of the state, although it stands but twenty-fifth on the list of counties in regard to the value of its mineral output for 1932, with a total of \$379,254, as compared with \$193,641 for 1931.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold -----		\$169,627
Silver -----	2,254 fine oz.	636
Stone, miscellaneous -----		131,625
Other minerals * -----		77,366
Total value -----		\$379,254

* Includes barytes, copper, granite, lead.

MENDOCINO

Land area: 3453 square miles.

Population: 23,491 (1930 census).

Location: Joins Humboldt County on the south and bounded by the Pacific Ocean on the west.

County seat: Ukiah.

References: State Mineralogist Report XIV: XVII: XVIII: XIX: XX.

Mendocino County's mineral output for 1932 is valued at \$101,669, which ranks it as forty-seventh among the counties of the state, compared with \$72,707 for 1931.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Value</i>
Stone, miscellaneous -----	\$101,619
Unapportioned -----	50
Total value -----	\$101,669

MERCED

Land area: 1995 square miles.

Population: 36,900 (1930 census).

Location: About the geographical center of the state.

County seat: Merced.

References: State Mineralogist Report XIV: XVII: XVIII: XXI (April, 1925).

Merced County ranks eighteenth as to value of mineral output for 1932, with six different substances worth \$749,742, compared with \$707,789 for 1931.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$391,017
Silver-----	1,861 fine oz.	525
Stone, miscellaneous-----	-----	22,500
Other minerals *-----	-----	335,700
Total value -----		\$749,742

* Includes cement, platinum, volcanic ash (pumicite).

MODOC

Land area: 3823 square miles.

Population: 8038 (1930 census).

Location: The extreme northeast corner of the state.

County seat: Alturas.

References: State Mineralogist Report XV: XVII: XVIII: XXV (Jan., 1929).

Modoc County in forty-ninth place, with six different substances, commercial production for 1932 being as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$2,082
Silver-----	102 fine oz.	29
Stone, miscellaneous-----	-----	48,221
Other minerals *-----	-----	670
Total value -----		\$51,002

* Includes gems (iceland-spar), salt.

MONO

Land area: 3030 square miles.

Population: 1359 (1930 census).

Location: Is bordered by the state of Nevada on the east and is about in the central portion of the state measured on a north and south line.

County seat: Bridgeport.

References: State Mineralogist Report XV: XVII: XVIII: XX: XXIII (Oct., 1927).

Mono County in forty-third place with eight different mineral substances, commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Copper-----	3,970 lbs.	\$250
Gold-----	-----	26,333
Lead-----	33,401 lbs.	1,002
Silver-----	18,767 fine oz.	5,292
Stone, miscellaneous-----	-----	64,942
Other minerals *-----	-----	37,861
Total value -----		\$135,680

* Includes andalusite and pumice.

MONTEREY

Land area: 3330 square miles.

Population: 53,668 (1930 census).

Location: West-central portion of state, bordering on Pacific Ocean.

County seat: Salinas.

References: State Mineralogist Report XV: XVII: XVIII: XIX: XXI (Jan., 1925).

Monterey County produced 11 different mineral substances during 1932, having a total value of \$166,297, as compared with \$223,470 for 1931.

In forty-second place, commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	----	\$794
Sandstone-----	----	10,560
Silver-----	4 fine oz.	1
Stone, miscellaneous-----	----	95,802
Other minerals *-----	----	59,140
Total value -----		\$166,297

* Includes coal, diatomite, natural gas, salt, silica (glass sand).

NAPA

Land area: 783 square miles.

Population: 22,832 (1930 census).

Location: Directly north of San Francisco Bay—one of the 'bay counties.'

County seat: Napa.

References: State Mineralogist Report XIV: XVII: XVIII:XX: XXV (April, 1929).

In 1932 the value of Napa County's mineral output was \$169,633, placing it in fortieth place in the list of counties, as compared with \$396,841 for 1931.

With seven different mineral substances, commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Mineral water-----	33,011 gals.	\$12,293
Quicksilver-----	647 flasks	34,634
Stone, miscellaneous-----	----	115,982
Other minerals *-----	----	6,724
Total value -----		\$169,633

* Includes asbestos, pumice, sandstone.

NEVADA

Land area: 974 square miles.

Population: 10,589 (1930 census).

Location: North of Lake Tahoe, on the eastern border of the state.

County seat: Nevada City.

References: State Mineralogist Report XVI: XVII: XVIII: XIX: XX: XXVI (April, 1930).

Nevada, one of the mountain counties of California, for some years alternated with Amador in the gold lead, but both were passed by Yuba in 1918-1921, also 1923. In 1922, 1924, 1929 to 1932, Nevada led all

counties in gold output, but it held third place in 1925 and 1928, and second place in 1926 and 1927. Nevada County stands ninth on the list of counties in regard to value of its mineral output for 1932, with six substances worth \$3,704,103, as compared with \$3,497,218 for 1931. The increase was due to gold.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Copper-----	33,454 lbs.	\$2,108
Gold-----	-----	3,640,797
Lead-----	82,119 lbs.	2,464
Silver-----	105,916 fine oz.	29,868
Stone, miscellaneous-----	-----	24,866
Unapportioned-----	-----	4,000
Total value -----	-----	\$3,704,103

ORANGE

Land area: 795 square miles.

Population: 118,611 (1930 census).

Location: Southwestern portion of state, bordering Pacific Ocean.

County seat: Santa Ana.

References: State Mineralogist Report XV: XVII: XVIII: XIX: XX: XXI (Jan., 1925).

Orange County in fifth place as to value of mineral output for 1932, produced eight different mineral substances worth \$14,182,245 as compared with the 1931 output, worth \$15,135,148.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Clay (pottery)-----	9,892 tons	\$33,217
Natural gas-----	11,374,502 M cu. ft.	1,095,752
Petroleum-----	16,981,368 bbls.	12,939,802
Stone, miscellaneous-----	-----	87,592
Other minerals *-----	-----	25,882
Total value -----	-----	\$14,182,245

* Includes brick, mineral water, quicksilver.

PLACER

Land area: 1395 square miles.

Population: 24,442 (1930 census).

Location: Eastern border of state directly west of Lake Tahoe.

County seat: Auburn.

References: State Mineralogist Report XV: XVII: XVIII: XIX: XX: XXIII (July, 1927).

Placer County in thirty-sixth place, with nine different mineral substances, commercial production for 1932 was as follows, compared with \$285,848 for the previous year:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Clay (pottery)-----	35,825 tons	\$49,037
Gold-----	-----	104,089
Granite-----	6,450 cu. ft.	22,625
Silver-----	1,006 fine oz.	284
Stone, miscellaneous-----	-----	40,405
Other minerals *-----	-----	23,808
Total value -----	-----	\$240,248

* Includes brick and hollow building tile, copper, mineral water.

PLUMAS

Land area: 2594 square miles.

Population: 7909 (1930 census).

Location: Northeastern border of state, south of Lassen County.

County seat: Quincy.

References: State Mineralogist Report XVI: XVII: XVIII: XIX: XX: XXIV (Oct., 1928).

Plumas County's mineral output for 1932, with eight different substances, was valued at \$181,312, as compared with \$1,559,296 for 1931. The decrease was due to copper.

In thirty-ninth place, commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Copper-----	1,043,390 lbs.	\$65,734
Gold-----	-----	76,781
Silver-----	29,008 fine oz.	8,180
Stone, miscellaneous-----	-----	20,000
Other minerals *-----	-----	10,617
Total value -----		\$181,312

* Includes barytes, granite, platinum.

RIVERSIDE

Land area: 7240 square miles.

Population: 82,078 (1930 census).

Location: Southern portion of state.

County seat: Riverside.

References: State Mineralogist Report XV: XVII: XVIII: XX: XXV (Oct., 1929).

Riverside is the fourth county in the state in size and the twelfth in regard to the total value of mineral output for 1932. Within its borders are included mountain, desert, and agricultural land. In point of variety, Riverside County showed fourteen different minerals commercially produced in 1932. The decrease in the 1932 output from that of 1931, which was valued at \$2,526,503, was due mainly to cement and brick.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Clay (pottery)-----	23,958 tons	\$29,839
Gold-----	-----	20,788
Silver-----	450 fine oz.	127
Stone, miscellaneous-----	-----	204,218
Other minerals *-----	-----	1,426,883
Total value -----		\$1,681,855

* Includes brick and hollow building tile, cement, gems, copper, gypsum, lead, mineral water, silica (quartz and glass sand).

SACRAMENTO

Land area: 983 square miles.

Population: 141,915 (1930 census).

Location: North-central portion of State.

County seat: Sacramento.

References: State Mineralogist Report XV: XVII: XVIII: XX: XXI (Jan., 1925).

Sacramento stands tenth among the counties of the state as a mineral producer, the output, principally gold, for 1932 being valued at

\$2,339,923, as compared with the 1931 production worth \$2,259,674. In regard to gold output alone, this county ranks second, being exceeded only by Nevada, the Sacramento product coming from the dredges.

With eight mineral substances, commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Brick and hollow building tile-----	----	\$85,187
Gold-----	----	2,100,250
Silver-----	3,972 fine oz.	1,120
Stone, miscellaneous-----	----	135,544
Other minerals *-----	----	17,822
Total value -----		\$2,339,923

* Includes clay (pottery), natural gas, platinum.

SAN BENITO

Land area: 1392 square miles.

Population: 11,310 (1930 census).

Location: West-central portion of state.

County seat: Hollister.

References: State Mineralogist Report XV: XVII: XVIII: XX: XXII (April, 1926).

San Benito County ranks thirty-seventh among the counties in regard to value of total mineral production for 1932, having an output worth \$199,924, as compared with \$654,284 for the previous year. The decrease was due mainly to quicksilver.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Quicksilver-----	594 flasks	\$31,036
Stone, miscellaneous-----	---	142,638
Other minerals *-----	---	26,250
Total value -----		\$199,924

* Includes bentonite and limestone.

SAN BERNARDINO

Land area: 20,157 square miles.

Population: 133,827 (1930 census).

Location: Southeastern portion of state.

County seat: San Bernardino.

References: State Mineralogist Report XV: XVII: XVIII: XIX: XXVI (July, 1930): XXVII (July, 1931).

San Bernardino, by far the largest county in the State in area, ranks seventh as regards the value of its mineral output for 1932, with a total of \$6,043,335, as compared with the 1931 total of \$9,975,484, the decrease being due largely to cement.

San Bernardino for several years (except 1918) has led all other counties in the state in point of variety of minerals, producing commercially during 1932 a total of 21 different substances. This county also ranks fourth as a silver producer in the State, from the mines of the Randsburg district.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Clay (pottery)-----	1,096 tons	\$6,491
Copper-----	6,183 lbs.	387
Gold-----	-----	137,979
Lead-----	23,371 lbs.	701
Limestone-----	8,619 tons	23,717
Silver-----	178,161 fine oz.	50,241
Stone, miscellaneous-----	-----	197,230
Other minerals *-----	-----	5,626,589
Total value -----	-----	\$6,043,335

* Includes baryte, bentonite, borates, brick, calcium chloride, cement, gems, lime, mineral water, petroleum, potash, salt, soda, talc.

SAN DIEGO

Land area: 4221 square miles.

Population: 209,477 (1930 census).

Location: Extreme southwest corner of state.

County seat: San Diego.

References: State Mineralogist Report XIV: XVII: XVIII: XIX: XX: XXI (July, 1925).

San Diego ranks twenty-first in the total value of its mineral output for the year, with 16 different commercial minerals. The value for 1932 was \$375,176, as compared with the 1931 output worth \$852,447, the decrease being due mainly to miscellaneous stone.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$5,573
Granite-----	-----	8,963
Silver-----	112 fine oz.	32
Stone, miscellaneous-----	-----	187,671
Other minerals *-----	-----	172,937
Total value -----	-----	\$375,176

* Includes bentonite, brick and hollow building tile, bromine, clay (pottery), feldspar, gems, magnesium chloride, mineral water, salt, silica (quartz), tube mill pebbles.

SAN FRANCISCO

Land area: 46½ square miles.

Population: 637,212 (1930 census).

County seat: San Francisco.

References: State Mineralogist Report XVII: XVIII: XX: XXV (April, 1929).

Surprising as it may appear at first glance, San Francisco County is listed among the mineral producing sections of the state, actual production consisting mainly of crushed rock, sand and gravel.

In fifty-sixth place, commercial production for 1932 was as follows:

<i>Substance</i>	<i>Value</i>
Mineral output *-----	\$3,903

* Includes mineral water and miscellaneous stone.

SAN JOAQUIN

Land area: 1448 square miles.

Population: 102,871 (1930 census):

Location: Central portion of state.

County seat: Stockton.

References: State Mineralogist Report XIV: XVII: XVIII: XXI
(April, 1925).

San Joaquin County reported a mineral production for the year 1932, having a total value of \$270,492, as compared with \$462,196 for 1931.

In thirty-second place, commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	----	\$1,440
Silver-----	6 fine oz.	2
Stone, miscellaneous-----	----	76,701
Other minerals *-----	----	192,349
Total value -----		\$270,492

* Includes brick and natural gas.

SAN LUIS OBISPO

Land area: 3334 square miles.

Population: 29,617 (1930).

Location: Bordered by Kern County on the east and the Pacific Ocean on the west.

County seat: San Luis Obispo.

References: State Mineralogist Report XV: XVII: XVIII: XXI
(Oct., 1925).

The total value of the mineral production of San Luis Obispo County in 1932 was \$249,930, as compared with the 1931 output worth \$400,135.

In thirty-fifth place, commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	----	\$1,021
Petroleum-----	66,744 bbls.	36,709
Quicksilver-----	2,035 flasks	106,508
Silver-----	3 fine oz.	1
Stone, miscellaneous-----	----	105,075
Other minerals *-----	----	616
Total value -----		\$249,930

* Includes mineral water, volcanic ash, sandstone.

SAN MATEO

Land area: 447 square miles.

Population: 77,338 (1930 census).

Location: Peninsula, adjoined by San Francisco on the north.

County seat: Redwood City.

References: State Mineralogist Report XVII: XVIII: XXV
(April, 1929).

San Mateo County had a mineral output in 1932 of eight mineral substances, with a total value of \$1,343,450, as compared with the 1931 production worth \$2,230,509.

In fourteenth place, commercial production for 1932 was as follows:

<i>Substance</i>	<i>Value</i>
Stone, miscellaneous -----	\$169,689
Other minerals * -----	1,173,761
Total value -----	\$1,343,450

* Includes cement, limestone (shells), magnesium salts, natural gas, salt.

SANTA BARBARA

Land area: 2740 square miles.

Population: 65,075 (1930 census).

Location: Southwestern portion of state, adjoining San Luis Obispo on the south.

County seat: Santa Barbara.

References: State Mineralogist Report XV: XVII: XVIII: XIX: XXI (Oct., 1925).

Santa Barbara owes its position of sixth in the state in regard to its mineral output to the presence of productive oil fields within its boundaries. The total value of its mineral production during the year 1932 was \$7,583,197, as compared with the 1931 output of \$12,714,760.

With twelve different substances, commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Natural gas -----	4,479,831 M cu. ft.	\$309,154
Petroleum -----	6,658,649 bbls.	6,405,620
Quicksilver -----	129 flasks	6,773
Stone, miscellaneous -----	-----	87,605
Other minerals * -----	-----	774,045
Total value -----	-----	\$7,583,197

* Includes barytes, bituminous rock, brick, diatomite, marble (flagstone), mineral water.

SANTA CLARA

Land area: 1328 square miles.

Population: 144,921 (1930 census).

Location: West-central portion of state.

County seat: San José.

References: State Mineralogist Report XVII: XVIII: XX: XXVI (Jan., 1930).

Santa Clara County reported a mineral output for 1932 of \$321,627, as compared with the 1931 figures of \$666,300.

In twenty-ninth place, with ten substances, commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Brick -----	2,858 M	\$25,281
Limestone (shells) -----	17,250 tons	53,690
Petroleum -----	12,954 bbls.	7,125
Quicksilver -----	123 flasks	6,459
Stone, miscellaneous -----	-----	220,482
Other minerals * -----	-----	8,590
Total value -----	-----	\$321,627

* Includes magnesite, clay (pottery), mineral water.

SANTA CRUZ

Land area: 435 square miles.

Population: 37,405 (1930 census).

Location: Bordering Pacific Ocean, just south of San Mateo County.

County seat: Santa Cruz.

References: State Mineralogist Report XVII: XVIII: XXII (Jan., 1926).

The mineral output of Santa Cruz County, a portion of which is itemized below, amounted to a total value of \$1,047,766, giving the county a standing of fifteenth among all others in the state in this regard. This is a decrease from the 1931 figure of \$1,767,134.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Limestone-----	6,330 tons	\$15,292
Stone, miscellaneous-----	----	34,253
Other minerals *-----	----	998,221
Total value -----		\$1,047,766

* Includes bituminous rock, cement, lime.

SHASTA

Land area: 3858 square miles.

Population: 13,925 (1930 census).

Location: North-central portion of state.

County seat: Redding.

References: State Mineralogist Report XIV: XVII: XVIII: XIX: XXII (April, 1926).

Shasta County stood twenty-first in California among the mineral producing counties for 1932, with an output valued at \$610,986, as compared with the 1931 production worth \$666,086.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Copper-----	295,981 lbs.	\$18,647
Gold-----	----	529,935
Silver-----	14,088 fine oz.	3,973
Stone, miscellaneous-----	----	58,306
Unapportioned-----	----	125
Total value -----		\$610,986

SIERRA

Land area: 923 square miles.

Population: 2419 (1930 census).

Location: Eastern border of state just north of Nevada County.

County seat: Downieville.

References: State Mineralogist Report XVI: XVII: XVIII: XX: XXV (April, 1929).

Sierra County reported a mineral production of \$607,872, mainly gold, during the year 1932, as compared with the 1931 output worth \$691,365.

In twenty-second place, commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Copper-----	5,395 lbs.	\$340
Gold-----	-----	590,294
Lead-----	69,490 lbs.	2,005
Silver-----	8,041 fine oz.	2,268
Stone, miscellaneous-----	-----	12,965
Total value -----	-----	\$607,872

SISKIYOU

Land area: 6256 square miles.

Population: 25,505 (1930 census).

Location: Extreme north-central portion of State, next to Oregon boundary.

County seat: Yreka.

References: State Mineralogist Report XIV: XVII: XVIII: XIX: XX: XXI (Oct., 1925): XXVIII (Jan., 1931).

Siskiyou, fifth county in California in regard to size, located in a highly mineralized and mountainous country, ranks thirty-eighth in regard to the value of its mineral output for 1932. The 1931 production was valued at \$187,007.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$133,115
Silver-----	1,076 fine oz.	304
Stone, miscellaneous-----	-----	23,415
Other minerals *-----	-----	27,185
Total value -----	-----	\$184,019

* Includes lead, mineral water, quicksilver.

SOLANO

Land area: 822 square miles.

Population: 40,807 (1930 census).

Location: Touching San Francisco Bay on the northeast.

County seat: Fairfield.

References: State Mineralogist Report XIV: XVII: XVIII: XXIII (April, 1927).

Solano, while mostly valley land, produced mineral substances during the year 1932 to the total value of \$36,202, ranking fifty-first among the counties of the state, compared with 1931 output worth \$62,270.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Value</i>
Mineral output * -----	\$36,202

* Includes onyx, travertine, miscellaneous stone.

SONOMA

Land area: 1577 square miles.

Population: 62,248 (1930 census).

Location: South of Mendocino County, bordering on the Pacific Ocean.

County seat: Santa Rosa.

References: State Mineralogist Report XIV: XVII: XVIII: XXII (July, 1926).

Sonoma ranks forty-first among the counties of California during 1932, with a mineral output worth \$167,849, as compared with its 1931 production valued at \$252,636.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Mineral water-----	15,864 gals.	\$4,123
Quicksilver-----	247 flasks	11,642
Stone, miscellaneous-----	-----	151,734
Unapportioned-----	-----	350
Total value -----		\$167,849

STANISLAUS

Land area: 1450 square miles.

Population: 56,624 (1930 census).

Location: Center of state, bounded on south by Merced County.

County seat: Modesto.

References: State Mineralogist Report XIV:XVII:XVIII:XXI (April, 1925).

Gold has usually been the chief mineral product of Stanislaus County, but it was exceeded in 1918-1919 by manganese, and in 1921-1923 and 1925-1930 by miscellaneous stone. This county for 1932 ranked twenty-seventh in the State in regard to minerals, with an output of \$333,482, as compared with \$277,281 in 1931.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$152,865
Lead-----	607 lbs.	18
Silver-----	668 fine oz.	194
Stone, miscellaneous-----	-----	55,595
Other minerals *-----	-----	124,482
Total value -----		\$333,482

* Includes pottery clay, magnesite, platinum.

SUTTER

Land area: 608 square miles.

Population: 14,618 (1930 census).

Location: Bounded by Butte County on the north and Sacramento on the south.

County seat: Yuba City.

References: State Mineralogist Report XV:XVII:XVIII.

Sutter is one of only two counties in the state which for a number of years reported no commercial output of some kind of mineral substance. In 1917 some crushed rock was taken out, from the Marysville Buttes, also in 1925-1928.

There has been some utilization of natural gas. There was no mineral production reported in 1932. Both clay and coal exist here, but deposits of neither mineral have been placed on a productive basis.

TEHAMA

Land area: 2893 square miles.

Population: 13,839 (1930 census).

Location: North-central portion of the state, bounded on the north by Shasta.

County seat: Red Bluff.

References: State Mineralogist Report XV: XVII: XVIII: XIX: XXIV (July, 1928).

Tehama stands fifty-fourth among the mineral producing counties of the state for 1932, when the output was valued at \$14,387, as compared with the 1931 yield worth \$50,407.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Value</i>
Stone, miscellaneous -----	\$11,887
Other minerals * -----	2,500
Total value -----	\$14,387

* Includes brick and sandstone.

TRINITY

Land area: 3166 square miles.

Population: 2811 (1930 census).

Location: Northwestern portion of state.

County seat: Weaverville.

References: State Mineralogist Report XIV: XVII: XVIII: XIX: XX: XXII (Jan., 1926.)

Trinity County's 1932 output of mineral was valued at \$325,275, as compared with the 1931 figures of \$328,522, mainly due to gold, giving the county rank of twenty-eighth for the year.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Lead -----	295 lbs.	\$8
Gold -----	---	294,297
Platinum -----	19 oz.	473
Silver -----	2,155 fine oz.	608
Stone, miscellaneous -----	---	17,160
Other minerals * -----	---	12,729
Total value -----		\$325,275

* Includes coal and quicksilver.

TULARE

Land area: 4856 square miles.

Population: 77,375 (1930 census).

Location: Bounded by Inyo on the east, Kern on the south, Fresno on the north.

County seat: Visalia.

References: State Mineralogist Report XV: XVII: XVIII: XX.

Tulare stands forty-fifth on the list of mineral-producing counties, for 1932 with twelve different substances having a total value of \$116,074, compared with the 1931 output which was worth \$197,116.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$141
Silver-----	4 fine oz.	1
Stone, miscellaneous-----	-----	72,541
Other minerals *-----	-----	43,391
Total value -----	-----	\$116,074

* Includes copper, barytes, brick and hollow building tile, gems, granite, lime, petroleum, tungsten.

TUOLUMNE

Land area: 2190 square miles.

Population: 9239 (1930 census).

Location: East-central portion of state—Moth Lode District.

County seat: Sonora.

References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX : XXIV (Jan., 1928).

Tuolumne ranks thirtieth among counties of the state relative to its total value of mineral output for 1932 with 10 different substances. This county ranks first as a producer of marble in the state. The mineral production for 1932 was valued at \$300,458, compared with \$377,157 for 1931.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$93,939
Silver-----	758 fine oz.	214
Stone, miscellaneous-----	-----	87,814
Other minerals *-----	-----	118,491
Total value -----	-----	\$300,458

* Includes chromite, lime, limestone, marble, slate, soapstone.

VENTURA

Land area: 1878 square miles.

Population: 54,577 (1930 census).

Location: Southwestern portion of state, bordering on Pacific Ocean.

County seat: Ventura.

References: State Mineralogist Report XV : XVII : XVIII : XX : XXI : XXVIII (July-Oct., 1932).

Ventura is fourth county in the state in respect to the value of its mineral output for 1932. Its value passed that of Orange County, which for many years held this position. The 1932 mineral production was worth \$14,855,606, as compared with the 1931 output worth \$15,455,727.

With eleven different mineral substances, commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Clay (pottery and oil well drilling)-----	9,774 tons	\$1,683
Gold-----	-----	887
Natural gas-----	40,432,752 M cu. ft.	2,393,920
Petroleum-----	14,461,476 bbls.	12,277,793
Silver-----	16 fine oz.	5
Stone, miscellaneous-----	-----	144,515
Other minerals *-----	-----	36,803
Total value -----	-----	\$14,855,606

* Includes brick and hollow building tile, granite (tuff), limestone (marl), sandstone.

YOLO

Land area: 1017 square miles.

Population: 23,618 (1930 census).

Location: Sacramento Valley, bounded by Sutter on the east and Colusa on the north.

County seat: Woodland.

References: State Mineralogist Report XIV: XVII: XVIII.

The mineral production from Yolo County during the year 1932 consisted entirely of miscellaneous stone, valued at \$21,625, ranking it in fifty-third place.

YUBA

Land area: 639 square miles.

Population: 11,327 (1930 census).

Location: Lies west of Sierra and Nevada counties; south of Plumas.

County seat: Marysville.

References: State Mineralogist Report XV: XVII: XVIII: XX: XXVI (July, 1930).

Yuba County ranks seventeenth among the counties of the state as a mineral producer and fourth in respect to gold, which is obtained mainly by dredgers. The 1931 output was valued at \$1,022,826.

Commercial production for 1932 was as follows:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Gold-----	-----	\$960,749
Silver-----	3,244 fine oz.	915
Stone, miscellaneous-----	-----	27,485
Total value -----	-----	\$989,149

CHAPTER VIII

DIRECTORY OF PRODUCERS OF METALLIC AND NON-METALLIC MINERALS IN CALIFORNIA, 1932

Note—The producers of natural gas and petroleum will be found in the Quarterly Summary of Operations, California Oil Fields, for July, August and September, 1932 (Vol. 18, No. 1).

ASBESTOS

Operator	Product	Address	Location of mine
<i>Napa County</i> U. S. Asbestos Corp., Ltd.	Chrysotile	Mills Tower, San Francisco	Steel Canyon

BARYTES

Operator	Address	Location of mine
<i>Mariposa County</i> National Pigments Co.	Russ Bldg., San Francisco	El Portal
<i>Plumas County</i> Synthetic Iron Color Co.	P.O. Box 1157, Richmond	Almanor
<i>San Bernardino County</i> Mineral Milling Co.	1081 Richmond St., Los Angeles	
<i>Santa Barbara County</i> Lucky Tom Mine, Henry C. Tunnel	Santa Maria	La Brea
<i>Tulare County</i> Z. E. Page	129 Honolulu St., Lindsay	Camp Nelson

BENTONITE (FULLER'S EARTH)

Operator	Address	Location of mine
<i>Inyo County</i> California Desert Products Co.....	58 Sutter St., San Francisco.....	Death Valley Junction
<i>Kern County</i> Muroc Clay Co.....	5525 Randolph St., Maywood.....	Muroc
<i>San Benito County</i> D. L. Stewart Property, A. P. Stewart, Lessee.....	1052 Vermont St., San Jose.....	Tres Pinos
<i>San Bernardino County</i> Walter Becker..... California Tale Co.....	P. O. Box 374, Red Mountain..... 837 Jackson St., Los Angeles.....	Red Mountain Hector
<i>San Diego County</i> Standard Oil Co. of California.....	Standard Oil Bldg., San Francisco.....	Palm Siding

BITUMINOUS ROCK

Operator	Address	Location of mine
<i>Santa Barbara County</i> Higgins Quarry, D. A. Sattler, lessee.....	856 Arguello Rd., Santa Barbara.....	Carpinteria
<i>Santa Cruz County</i> Calrock Asphalt Co.....	525 Market St., San Francisco.....	Majors

BORATES

Operator	Address	Location of mine
<i>Inyo County</i> Pacific Alkali Co.....	1209 Pacific Mutual Bldg., Los Angeles.....	Bartlett
<i>Kern County</i> Pacific Coast Borax Co..... Suckow Borax Mines Consolidated, Inc., John K. Suckow..... Western Borax Co.....	1014 Central Bldg., Los Angeles..... 1283 Third Ave., Los Angeles..... 566 Subway Terminal Bldg., Los Angeles.....	Kramer Muroc Muroc
<i>San Bernardino County</i> American Potash and Chemical Corp..... West End Chemical Co.....	Trona..... Syndicate Bldg., Oakland.....	Trona Searles Lake

BROMINE

Operator	Address	Location of mine
<i>San Diego County</i> California Chemical Corp.....	Box 8-A Newark.....	San Diego

CALCIUM CHLORIDE

Operator	Address	Location of mine
<i>San Bernardino County</i> California Rock Salt Co..... Saline Products, Inc.....	2465 Hunter St., Los Angeles..... 2000 Santa Fe Ave., Los Angeles.....	Amboy Amboy

CEMENT

Operator	Address	Location of mine
<i>Calaveras County</i> Calaveras Cement Co.....	315 Montgomery St., San Francisco.....	San Andreas
<i>Contra Costa County</i> Henry Cowell Lime and Cement Co.....	2 Market St., San Francisco.....	Cowell
<i>Kern County</i> Monolith Portland Cement Co.....	Bartlett Bldg., Los Angeles.....	Monolith
<i>Los Angeles County</i> Blue Diamond Corp.....	1650 S. Alameda St., Los Angeles.....	Los Angeles
<i>Merced County</i> Yosemite Portland Cement Co.....	Merced.....	Merced
<i>Riverside County</i> Riverside Cement Co.....	621 S. Hope St., Los Angeles.....	Riverside
<i>San Bernardino County</i> California Portland Cement Co..... Southwestern Portland Cement Co.....	1228 Pacific Mutual Bldg., Los Angeles..... 503 Roosevelt Bldg., Los Angeles.....	Colton Victorville
<i>San Mateo County</i> Pacific Portland Cement Co.....	111 Sutter St., San Francisco.....	Redwood City
<i>Santa Cruz County</i> Santa Cruz Portland Cement Co.....	Crocker Bldg., San Francisco.....	Davenport

CHROMITE

Operator	Remarks	Address	Location of mine
<i>Tuolumne County</i> McCormick Chrome Mine, Robert McCormick.....	s	Jamestown.....	Jamestown

s. Shipped ore, mined prior to 1932.

CLAY

(Including producers of crude clay and manufacturers of brick, tile, porcelain, etc.)

Operator	Remarks	Address	Location of mine
<i>Alameda County</i>			
California Faience Co.	a	1335 Hearst Ave., Berkeley	Berkeley
California Pottery Co.	a, c	Niles	Niles
N. Clark & Sons	a, b, c	116 Natomas St., San Francisco	Alameda
Livermore Fire Brick Work and California Brick Plant, W. S. Dickey Clay Mfg. Co.	a, b, c	Rialto Bldg., San Francisco	Livermore and Fabrico
Electrical Porcelain Works	a	2416 6th St., Berkeley	Berkeley
A. K. Goodmundson Co.	a	717 45th Ave., Oakland	Oakland
Interlocking Tile Co.	a, c	Niles	Niles
Kraftile Co., L. J. Layton	a	Niles	Niles
Muresque Tiles, Inc.	a	503 Merchants Exchange Bldg., San Francisco	Oakland
Remillard Brick Co., R. C. Giroux, Secy.	b	569 3d St., Oakland	Pleasanton
Technical Porcelain and China Ware Co.	a	420 Kains Ave., Albany, via Berkeley, Cal.	Albany
Emeryville Porcelain Works, Westinghouse Elec. and Mfg. Co.	a	61st and Green Sts., Emeryville	Emeryville
Walrich Pottery	a	1285 Hearst Ave., Berkeley	Berkeley
Woolenius Tiles and Mantels	a	1315 2d St., Berkeley	Berkeley
<i>Amador County</i>			
M. J. Bacon	c	lone	Carbondale
lone Clay and Sand Pit, Cal. Mineral Products Co.	e, f	Kohl Bldg., San Francisco	lone
Carlyle Clay Deposits, E. E. Tremain	c	Buena Vista, via R.F.D., lone	Buena Vista
N. Clark & Sons	c	116 Natoma St., San Francisco	lone
lone Clay Pit, W. S. Dickey Clay Mfg. Co.	c	Rialto Bldg., San Francisco	lone
lone Fire Brick Co., J. T. Roberts, Mgr.	b	1267 Russ Bldg., San Francisco	lone
Newman Clay Co., C. W. Forbes, lessee	c	lone	lone
<i>Calaveras County</i>			
California Pottery Co.	c	Niles	Valley Springs
<i>Contra Costa County</i>			
California Art Tile Corp.	a	Box 1116, Richmond	Richmond
Old Mission Tile Co.	a, c	1 20th St., Richmond	San Pablo
Port Costa Brick Works, C. G. Berg, Pres.	b	6th and Berry Sts., San Francisco	Port Costa

<i>Silica Sand Mine, Thomas G. Roberts.</i>	e	Pittsburg.	Nortonville
<i>Standard Sanitary Mfg. Co., H. W. Creger, Mgr.</i>	a	Box W, Richmond.	Richmond
<i>Western Potters, Ltd.¹</i>	a	136 Kearny St., El Cerrito.	El Cerrito
<i>Fresno County</i>			
<i>Crayeroft Brick Co.</i>	a, b	Griffith-McKenzie Bldg., Fresno.	Fresno
<i>Humboldt County</i>			
<i>J. D. Thompson Brick Co., J. D. Thompson, Mgr.</i>	a, b, c	Box 16, Myrtle Ave., Eureka.	Eureka
<i>Imperial County</i>			
<i>McKnight Clay Deposit, J. H. McKnight.</i>	c	Westminster Hotel, Los Angeles.	Glamis
<i>Inyo County</i>			
<i>California Desert Products Co.</i>	e	58 Sutter St., San Francisco.	Death Valley
<i>Kern County</i>			
<i>Bakersfield Sandstone Brick Co., Jas. Curran, Mgr.</i>	b	Bakersfield.	Bakersfield
<i>The Filtrol Co.</i>	e	1755 Downey Rd., Los Angeles.	Monolith
<i>King Lumber Co.</i>	b	1402 Kings St., Bakersfield.	Bakersfield
<i>Muroe Clay Co.</i>	e	5525 Randolph St., Maywood, Cal.	Muroe
<i>Mojave Rotary Mud Co., Ltd.</i>	d	Box 174, Los Nietos.	Muroe
<i>Vitrefrac Co.</i>	e	5050 Pacific Blvd., Los Angeles.	Cantil
<i>Los Angeles County</i>			
<i>Alhambra Kilns, Inc., W. Boswell.</i>	a	Alhambra.	Alhambra and Santa Monica
<i>American Encaustic T. Co.</i>	a	52d and Alameda Sts., Los Angeles.	Los Angeles
<i>American Refractories Co.</i>	a, b	3232 Alosta St., Los Angeles.	Los Angeles
<i>Angulo Tile Plant, R. F. Angulo & Sons</i>	a, c	Reseda.	Reseda
<i>Art Tile Co.</i>	a	2304 E. 52d St., Los Angeles.	Vernon
<i>Batchelder-Wilson Tile Co.</i>	a	2633 Artesian St., Los Angeles.	Los Angeles
<i>J. A. Bauer Pottery Co.</i>	a	415 W. Ave. 33, Los Angeles.	Los Angeles
<i>J. Booth.</i>	a	7578 Melrose, Los Angeles.	Santa Monica
<i>Builders Brick Co., Ltd.</i>	b	177th and Western Aves., Moneta.	Moneta
<i>Caleo Tile Mfg. Corp.</i>	a	South Gate.	South Gate
<i>California Clay Prod. Co., Ltd.</i>	a, c	Box 568, Whittier.	Whittier
<i>City Brick Co.</i>	b	1900 W. Manchester, Los Angeles.	Los Angeles
<i>Claycroft Potteries, Fred H. Robertson.</i>	a	3101 San Fernando Blvd., Los Angeles.	Los Angeles
<i>Compton Brick and Tile Co.</i>	b	402 Pacific S.W. Bldg., Long Beach.	Compton
<i>Consolidated Brick & Tile Co., Ltd.</i>	a, b, c	306 Architect Bldg., Los Angeles.	Los Angeles, Long Beach and Santa Monica

a. Clay products. b. Brick and hollow building tile. c. Crude clay. d. Oil well drilling mud. e. Filtering clay. f. Fire sand.

¹ Suspended operations in July, 1932.

CLAY—Continued
(Including producers of crude clay and manufacturers of brick, tile, porcelain, etc.)

Operator	Remarks	Address	Location of mine
<i>Los Angeles</i> —Continued			
Coors Co., H. F., Inc.	a	Ingleswood	Ingleswood
Davidson Brick Co.	b	4701 Floral Dr., Los Angeles	Los Angeles
Eljer California Co.	a	4100 Alameda, Los Angeles	Arcadia
Emsco Refractories Co.	b	8661 Dorothy Ave., South Gate	South Gate
Tropico, L. A. & S. M. Plants, Gladding, McBean & Co.	a, b, c	660 Market St., San Francisco	Tropico, Los Angeles and Santa Monica
Higgins Brick & Tile Works, James R. Higgins	a, b, c	155 E. 121st St., Los Angeles	Moneta
Italian Terra Cotta Co.	a	1149 Mission Rd., Los Angeles	Los Angeles
K. & K. Brick Co., Geo. H. Snyder, Pres.	b	730 C. C. Chapman Bldg., Los Angeles	Bishop Canyon
K. & M. Pottery Co.	a	2318 E. 52d St., Los Angeles	Los Angeles
Long Beach Brick Co., Inc., H. A. Havner, Mgr.	b	154 Elm Ave., Long Beach	Long Beach
Malibu Potteries	a	P.O. Box 518, Santa Monica	Santa Monica
Markoff Mosaic Tile Corp.	a	1107 E. Redondo Blvd., Ingleswood	Ingleswood
Pacific Clay Products	a, b, c	650 Chamber of Comm. Bldg., Los Angeles	Los Angeles and Los Nietos
Pomona Brick Co., Wm. McMullen, Mgr.	b	Pomona	Pomona
Pomona Tile Mfg. Co.	a	Pomona	Pomona
San Valle Tile Kilns, R. F. Stubber, Mgr.	a, c	6601 Wilbur, Reseda	Reseda
Santa Catalina Island Co., Wm. Wrigley, Jr.	a, b, c	Avalon	Santa Catalina Island
St. Louis Fire Brick and Clay, Joseph Mesmer	a, b	3050 E. Slauson St., Los Angeles	Los Angeles
Simons Brick Co., Walter R. Simons	a, b, c	1195 S. Boyle Ave., Los Angeles	Los Angeles
Standard Brick Co.	b	1760 S. Sato St., Los Angeles	Los Angeles
Tillotson Clay Products	a, b	3363 Fruitland Rd., Vernon	Vernon
Tudor Potteries	a	2406 E. 58th St., Los Angeles	Los Angeles
Vernon Potteries	a	2300 E. 52d St., Los Angeles	Vernon
Vitrelex Company	a, b	5100 Pacific Ave., Los Angeles	Vernon
West Coast Tile Manufacturers	a, c	2080 E. Slauson Ave., Huntington Park	Huntington Park
Western Standard Tiling Co.	a	1461 Lincoln St., Hollywood	Hollywood
<i>Marin County</i>			
McNear Brick Co.	a, b	McNear Point, San Rafael	McNear

Orange County

American Fire Clay Co.	c	5050 Pacific Blvd., Vernon	San Juan
Arnold Clay Pit, I. P. Arnold	c	1821 W. 68th St., Los Angeles	El Toro
Gladding, McBean & Co.	c	660 Market St., San Francisco	
La Bolsa Tile Co., A. N. Griffith	a, b, c	Rt. 1, Box 174, Huntington Beach	Stolzner
Mission Clay Products Co.	a, b, c	Olive	Olive

Placer County

Clay Corp. of Cal.	c	1267 Russ Bldg., San Francisco	Lincoln
Gladding, McBean & Co.	a, b, c	5th floor, 660 Market St., San Francisco	Lincoln
Lincoln Clay Products Co., M. J. Dillman, Mgr.	c	Lincoln	

Riverside County

Alberhill Coal and Clay Co.	c	Alberhill	Alberhill
Ensco Clay Co.	c	5701 S. Boyle Ave., Vernon	Corona
Gladding, McBean & Co.	a, b, c	660 Market St., San Francisco	Alberhill
Los Angeles Brick Co.	a, b, c	1078 Mission Rd., Los Angeles	Alberhill
Geo. H. Morton	c	Elsinore	Elsinore
Pacific Clay Products	c	650 Chamber of Commerce Bldg., Los Angeles	Corona
Tarwater & Southard	c	Murietta	Murietta

Sacramento County

Cannon & Co.	a, b, c	Box 281, Sacramento	Ben Ali
H. C. Muddox, Jessie E. Muddox, Owner	a, b	30th and L Sts., Sacramento	Sacramento
Panama Pottery Co.	a	Box 1478, R.F.D. No. 4, 24th St. Rd., Sacramento	Sacramento
Sacramento Brick Co.	b	1400 Front St., Sacramento	Sacramento
Valley Brick Co.	b	P. O. Box 1180, Sacramento	Sacramento

San Benito County

D. L. Stewart Property, A. P. Stewart, lessee	c	1052 Vermont St., San Jose	Tres Pinos
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San Bernardino County

Becker, Walter	c	P. O. Box 374, Red Mountain	Searles Station
California Tale Co.	c, c	837 Jackson St., Los Angeles	Hector
A. B. Clark, Estate	c	1102 New State Bldg., Los Angeles	Oro Grande
Hancock Brick Yard, C. P. Hancock & Son	a, b, c	4330 Lemon St., Riverside	Highgrove
Kennedy Clay Pit, John Kennedy	c	Daggett	Daggett
Page, Lew	c	1155 King St., San Bernardino	Searles

San Diego County

Pacific Clay Products Co.	c	650 Chamber of Commerce Bldg., Los Angeles	Farr Station
Standard Oil of California	c	Standard Oil Bldg., San Francisco	Palm Siding
Union Brick Co., J. W. Rice	b	3565 3d St., North San Diego	Rose Canyon
Vitrified Products Corp.	a, b, c	2841 Jefferson St., North San Diego	North San Diego

a. Clay products. b. Brick and hollow building tile. c. Crude clay. e. Filtering clay.

CLAY—Continued

(Including producers of crude clay and manufacturers of brick, tile, porcelain, etc.)

Operator	Remarks	Address	Location of mine
<i>San Joaquin County</i>			
San Joaquin Brick Co., J. F. Stein, Secy.	b	33 S. El Dorado St., Stockton	Stockton
Stockton Fire Brick Co., John T. Roberts, Mgr.	b	Stockton	Stockton
Stockton Pottery Co.	a	600 E. Main St., Stockton	Stockton *
<i>San Mateo County</i>			
Richmond Potteries, Inc.	a	Box 187, South San Francisco	South San Francisco
West Coast Porcelain Co.	a	P. O. Box 46, Millbrae	Millbrae
<i>Santa Barbara County</i>			
Associated Clay Products Co., Elmer H. Whittaker, owner	b	124 E. Arillage St., Santa Barbara	Santa Barbara
<i>Santa Clara County</i>			
Coyote Creek Clay Beds, L. R. Lemfest	c	1195 E. Santa Clara St., San Jose	San Jose
Garden City Pottery, N. J. Mahone	a	560 N. 6th St., San Jose	San Jose
Gladding Bros. Mfg. Co.	a, b, c	South 3d and Keys Sts., San Jose	San Jose
Handcraft Tile Co., L. W. Austin et al.	a	Route 2, Box 121A, San Jose	San Jose
Remillard Brick Co.	b	569 3d St., Oakland	San Jose
San Jose Brick Co.	b	P. O. Box 274, San Jose	San Jose
S. & S. Tile Co.	a	1881 S. 1st St., San Jose	San Jose
Santa Clara Pottery, Geo. J. Paxon	a	1881 Monterey Rd., San Jose	Santa Clara
<i>Stanislaus County</i>			
Coopertown Clay Deposit, J. H. Hornsby	a	651 Cumberland St., Pittsburg	Coopertown
<i>Tehama County</i>			
O'Connor Bros.	b	Red Bluff	Red Bluff
<i>Tulare County</i>			
San Joaquin Materials Co.	b	744 G St., Fresno	Exeter
<i>Ventura County</i>			
Peoples Lumber Co., C. E. Bonestel, Mgr.	a, b, c	708 E. Meta St., Ventura	Ventura
Dent Clay Pit, Shell Oil Co.	d	Shell Bldg., San Francisco	Ventura

a. Clay products. b. Brick and hollow building tile. c. Crude clay. d. Oil well drilling mud.

COAL

Operator	Remarks	Address	Location of mine
<i>Amador County</i> Buena Vista Coal Mining Co., J. J. Morras, Supt.-----		Ione, c/o R.F.D.-----	Buena Vista
<i>Monterey County</i> California Coal & Coke Corp.-----		Wells Fargo Bldg., San Francisco-----	Stone Canyon
<i>Trinity County</i> Big Bar Coal Mining Co., E. O. E. Klippbahn, Secy.-----		Route 1, Box 92A, Grass Valley-----	Big Bar

COPPER

Principal Copper Producers in California in 1932

Mine	Operator	Address	Location of mine
<i>Nevada County</i> Empress----- Spanish-----	Empress Gold Mining Co.----- Spanish Mining Co.-----	Box 914, Grass Valley----- Crocker Bldg., San Francisco-----	Grass Valley Washington
<i>Plumas County</i> Walker-----	Walker Mining Co.-----	Kearns Bldg., Salt Lake City, Utah-----	Walker mine
<i>Shasta County</i> Hornet-----	Mountain Copper Co., Ltd., W. S. Howard-----	112 Market St., San Francisco-----	Matheson

DIATOMITE (DIATOMACEOUS EARTH)

Operator	Remarks	Address	Location of quarry
<i>Fresno County</i> Mineral Products Mfg. Co., T. H. Eliatt and L. J. Allen		3464 Ventura St., Fresno	Mendota
<i>Los Angeles County</i> The Dicalite Co.		756 S. Broadway, Los Angeles	San Pedro
<i>Monterey County</i> Pacatome, Ltd.		Bradley	Bradley
<i>Santa Barbara County</i> Johns-Manville Products Corp.		Lompoc	Lompoc

DOLOMITE

Operator	Remarks	Address	Location of quarry
<i>Inyo County</i> Inyo Marble Co. Fred Ward & Co.		361 N. Avenue 22, Los Angeles Box 65, Lone Pine	Lone Pine Keeler
<i>Monterey County</i> Pacific Coast Steel Corp., Sterling Ranch Quarry		20th and Illinois Sts., San Francisco	Natividad

FELDSPAR

Operator	Remarks	Address	Location of mine
<i>Inyo County</i> White King Deposit, H. W. Wright		1238 Huntington Dr., Los Angeles	Linne
<i>San Diego County</i> Mineral Milling Co. Standard Sanitary Mfg. Co., P. R. Jones, Mgr.		1081 Richmond St., Los Angeles Campo	White Oak Springs Campo

Operator	Address	Location of mine
<i>Riverside County</i> Sunny Day Mine, J. I. Fassett		Indio

GEMS

Operator	Variety	Address	Location of mine
<i>Counties, various</i> Folker Research Laboratory, Max N. Folker	Rose quartz, blue-agate, nyrckite, jasper, bloodstone, chrysoprase, amethyst	3321 Emerald St., Torrance	
<i>Butte County</i>	Diamonds		Cherokee
<i>Calaveras County</i> Green Mountain Mine, J. J. McSorley, Mgr.	Quartz crystals	Mokelumne Hill	Mokelumne Hill
<i>Fresno County</i> Sierra Gem Mine, C. M. Carter	Topaz	Youngs P. O., El Dorado Co.	Friant
<i>Modoc County</i> Iceland Spar Mine, J. D. Patterson	Iceland-spar	Cedarville	Cedarville
<i>Riverside County</i> Carniger Mine, H. F. Heather	Iceland-spar	236 S. Oak Knoll Ave., Pasadena	Indio
<i>Tulare County</i> Janoiko Bros.	Chrysoprase	R. F. D. 1, Box 688, Porterville	Porterville

GOLD

Principal Gold Producers in California out of a Total of 1545 Operators of Placer and Lode Mines in 1932

Mine	Type of mine	Operator	Address	Location of mine
<i>Amador County</i>				
Argonaut	a	Argonaut Mining Co.	Jackson	Jackson
Commodore	a	George T. Williams	111 Sutter St., San Francisco	Pine Grove
Fuller Property	a	John J. Bernier	Jackson	Jackson
Kennedy	a	Kennedy Mining and Milling Co.	519 California St., San Francisco	Martell
Lancha Plana	e	Lancha Plana Gold Dredging Co.	Cananche	Cananche
Pioneer	a	Pioneer Lucky Strike Gold Mining Co.	Pine Grove	Pine Grove
Petersen Ranch	a	W. F. Petersen	Jackson	Jackson
Summit and Old Eureka	a	Central Eureka Mining Co.	Hunter-Dulin Bldg., San Francisco	Sutter Creek
Valparaiso	a	Valparaiso Mining Co., D. Boro	Jackson	Jackson
<i>Butte County</i>				
Cory	f	Cory Mining Co., Ltd.	381 Bush St., San Francisco	Magalia
Las Plumas	a	J. Wilson Reno and C. N. Erickson Co., Ltd.	Yankee Hill	Yankee Hill
Lillian	f	Nystrom & Simmons, lessees	Magalia	Magalia
Oroville Associates Placer	b	Oroville Associates	Oroville	Oroville
Shasta-Butte	e	Shasta-Butte Gold Dredging Co.	Oroville	Oroville
<i>Calaveras County</i>				
Calaveras	a	P. B. Russell and Associates, lessors	Sheepbranch	Sheepbranch
Calaveras Central	f	Calaveras Central Gold Mining Co., Ltd.	Hobart Bldg., San Francisco	Angels Camp
Easy Bird	a	T. B. Elliott	Mokelumne Hill	Mokelumne Hill
Gold Hill	a	Charles C. Crespi	Angels Camp	Angels Camp
Milton Dredge	e	Milton Mining Co.	Jenny Lind	Jenny Lind
Royal	a	F. S. Tower	Milton	Milton
<i>El Dorado County</i>				
Beebe	a	The Beebe Gold Mining Co.	Georgetown	Georgetown
Briarcliffe	a	Briarcliffe Mines, Ltd.	P.O. Box, Plymouth	Plymouth
Guldfork Lode	a	Golden Horseshoe Mining Corp., Ltd.	Placerville	Placerville
Montezuma	a	Nashville Mines Co.	Placerville	Placerville
Slate Mountain Group	a	R. W. Brooke	Box 222, Placerville	Georgetown
Sliger	a	Middle Fork Gold Mining Co.	315 Montgomery St., San Francisco	Georgetown

<i>Imperial County</i>					
Tumco.....	c	The Tumco Cyaniding Co., Percy Bowater.....	1668 Woodbury Rd., Pasadena.....	Ogilby	
<i>Inyo County</i>					
Old Mill Schist.....	a	Louis McCrea.....	Beatty, Nevada.....	Chloride Cliff	
Radebiff.....	a	Don H. Clair.....	Box 5, Trona.....	Trona	
<i>Kern County</i>					
Butte Lode.....	a	Butte Lode Mining Co., Henry Marsh.....	Box 336, Randsburg.....	Randsburg	
Elephant.....	a	Bert Fisher, J. S. Harper and Paul Stapler.....	Mojave.....	Mojave	
King Solomon.....	a	Shipsey Mining Co.....	123 E. 6th St., Los Angeles.....	Randsburg	
Operator.....	c	Gustav Bender.....	Johannesburg.....	Johannesburg	
Standard.....	a	Standard Mining and Milling Co.....	Mojave.....	Mojave	
Tropico.....	a	Burton Bros., Inc., Jessees Tropico Mine.....	Rosamond.....	Rosamond	
Windy.....	a	Rand Mines Co., Henry Marsh.....	Randsburg.....	Randsburg	
Yellow Aster.....	a	Yellow Aster Mining and Milling Co.....	Randsburg.....	Randsburg	
<i>Mariposa County</i>					
Diltz.....	c	E. R. Baker.....	Mariposa.....	Whitlock	
Feliciana.....	a, b	Gold Ledge Mining Co.....	Russ Bldg., San Francisco.....	Midpines	
Martinez.....	a	F. E. Martinez.....	Hornitos.....	Hornitos	
Original and Clearing House.....	a	Original Ferguson Mining and Milling Co.....	Mariposa.....	Clearinghouse	
Squantum.....	a	Mrs. F. P. Clark.....	Mariposa.....	Mariposa	
Virginia.....	a	F. L. Morris.....	Monadnock Bldg., San Francisco.....	Coulterville	
<i>Merced County</i>					
Merced Unit.....	c	Yuba Consolidated Goldfields.....	351 California St., San Francisco.....	Snelling	
Snelling Dredge.....	c	Snelling Dredging Co.....	Snelling.....	Snelling	
<i>Mono County</i>					
Sierra Vista.....	a	George W. Olsen.....	Box 308, Bishop.....	Laws	
<i>Nevada County</i>					
Empire-North Star.....	a	Empire-Star Mines Co., Ltd.....	R. 1507, 14 Wall St., New York, N. Y.....	Grass Valley	
Empress.....	a	Empress Gold Mining Co.....	Box 914, Grass Valley.....	Grass Valley	
Golden Center.....	a	Cooley Butler.....	Rowan Bldg., Los Angeles.....	Grass Valley	
Hoge.....	a	Hoge Development Co.....	Box 165, Nevada City.....	Nevada City	
Idaho-Maryland.....	a	Idaho-Maryland Mines Co.....	Russ Bldg., San Francisco.....	Grass Valley	
Marche.....	a	Empire-Star Mines Co., Ltd.....	Grass Valley.....	Nevada City	
Omega.....	g	Omega Hill Mining Co., Charles Moore, Mgr.....	560 Cooper Ave., Yuba City.....	Washington	
Spanish.....	a	Spanish Mining Co., James Bradley, Supt.....	Crocker Bldg., San Francisco.....	Washington	

¹ Number does not include snipers, prospectors and various individuals selling small lots to bullion dealers.

a, L de mine. b, Placer mine. c, Tailing dump. e, Dredge. f, Drift mine. g, Hydraulic mining.

GOLD—Continued

Principal Gold Producers in California out of a Total of 1545 Operators¹ of Placer and Lode Mines in 1932

Mine	Type of mine	Operator	Address	Location of mine
<i>Placer County</i>				
Big Oak Tree and Rising Sun	a	Paramount Gold Mines Corp.	Box 308, Colfax	Butcher Ranch
De Maria	d	C. J. De Maria	McKeon	McKeon
<i>Plumas County</i>				
Walker	a	Walker Mining Co.	820 Kearns Bldg., Salt Lake City, Utah	Spring Garden
<i>Riverside County</i>				
Arica	a	White, Ed. White, McIntyre & Favret	Blythe	Blythe
<i>Sacramento County</i>				
Capital	e	Capital Dredging Co.	Balfour Bldg., San Francisco	Folsom
Natomas	e	Natomas Co.	Forum Bldg., Sacramento	Natomas
<i>San Bernardino County</i>				
Black Hawk and Santa Fe	a	Arlington Mining Corp.	Room 505, 740 S. Broadway, Los Angeles	Victorville
Kelly and Santa Fe groups	a	Red Mountain Mines Syndicate	Red Mountain	Randsburg
<i>Shasta County</i>				
Iron Mountain	a	The Mountain Copper Co., Ltd.	112 Market St., San Francisco	Matheson
<i>Sierra County</i>				
Brush Creek	a	Kate Hardy Mining Co.	126 4th St., San Francisco	Alleghany
Depot Hill	a	F. J. Joubert	Camptonville	Camptonville
Eagle Bird	a	Acme Development Corp., Ltd.	Forum Bldg., Sacramento	Downieville
Original 16 to 1	a	Original 16 to 1 Mines, Inc.	Russ Bldg., San Francisco	Alleghany
Sacred Mound		Sacred Mound Mines, Ltd.	Box 265, Elk Grove	Sierra City
Sierra-Alaska	a	Sierra-Alaska Mining Co.	Financial Center Bldg., Oakland	Alleghany
<i>Siskiyou County</i>				
Gun Boot	a	McInnes & McCool	Scotts Bar	Scotts Bar
McConnell Bar	b	W. B. Boulter	Hornbrook	Hornbrook
Mount Vernon	a	Kenneth K. Ash	Box 916, Yreka	Yreka
S. T. S. and Gold Bank,				
John Frank	g	J. F. Judge	Sawyers Bar	Sawyers Bar
Sunnerville	b	W. B. Boulter	Hornbrook	Hornbrook

<i>Stanislaus County</i>					
La Grange	a	La Grange Gold Dredging Co.	Mills Bldg., San Francisco	La Grange	
<i>Trinity County</i>					
Big French Creek	b	French Bar Mining Co.	Del Loma	Del Loma	
Enterprise	a	Chickson Oil Co., Ltd.	Chapman Bldg., Fullerton	Helena	
Gold Bar	c	Gold Bar Dredging Corp.	Box 103, Lewiston	Lewiston	
Jacobs	g	Jacobs Estate, Nellie Braynard	1210 Jackson St., Red Bluff	Junction City	
Lewiston	c	Placer Development Co., Ltd.	Russ Bldg., San Francisco	Lewiston	
Modoc	a	Modoc Gold Mines, Inc.	Carrville	Carrville	
North Fork Placers	g	M. R. K. Mining Co.	Helena	Helena	
Salzer	g	Salzer Cons. Gold Mines Co.	Salzer	Salzer	
Trinity	c	Trinity Dredging Co.	Lewiston	Lewiston	
Trinity	g	Wallace Bros Group	Douglas City	Douglas City	
<i>Tuolumne County</i>					
Blgett	d	Robert Newmeyer	Sonora	Sonora	
Fifty-Five	a	Mother Lode Extension Mine, Inc.	2323 W. 6th St., Los Angeles	Merced Falls	
McCormick	a	Elm Mining Co., Victor Lemoge	281 Natoma St., San Francisco	Chinese Camp	
Sugarman-Niger	a	Ralph H. Butler	Box 504, Sonora	Sonora	
<i>Yuba County</i>					
Blue Point	g	Ed. H. Nutter (Jan. 1 to June 30)	220 Battery St., San Francisco	} Smartsville	
Red Cross	a	Blue Point Gravel (July 1 to Dec. 31)	5975 Clarendon St., Oakland, Cal.		} Dobbins
Yuba	c	Red Cross Mining Co.	620½ I St., Sacramento		
		Yuba Consolidated Gold Fields	351 California St., San Francisco		

10—9171

a. Lode mine. b. Placer mine. c. Tailing dump. d. Pocket mine. e. Dredge. g. Hydraulic mining.

GRANITE

Operator	Product	Address	Location of quarry
<i>Fresno County</i> Academy Granite Superior Granite Co., Inc.	a a	Clovis Clovis	Clovis Academy
<i>Madera County</i> McGilvray-Raymond Corp.	a	3 Potrero Ave., San Francisco	Raymond
<i>Mariposa County</i> Yosemite National Park	a	Yosemite	Yosemite Park
<i>Nevada County</i> Netz Granite Quarry, Ludwig Netz	a	Nevada City	Nevada City
<i>Placer County</i> Alexson Granite Co. A. Pernu Granite Quarries, Adolph Pernu Union Granite Co., Mat Rubkala	a a a	Rocklin Rocklin Rocklin	Rocklin Rocklin Rocklin
<i>Plumas County</i> Paul Sonognini	a	Chicoot	Chicoot
<i>San Diego County</i> American Marble and Granite Works Crystal Black Quarry, John Stridsburg Matson & Deering, Meyers Quarry McGee Quarry, Robert J. McGee McGilvray-Raymond Corp., Lakeside Quarry Mission Silver-Gray Granite Simpson-Pirnie Granite Co. Southern California Granite Co.	a a a a a a a	1212 E. 19th St., Los Angeles Escondido Lakeside Pala 678 S. Anderson St., Los Angeles 3422 Union Pacific Ave., Los Angeles 21st and N Sts., San Diego 3845 Imperial St., San Diego	Santee Spooks Canyon Lakeside Pala Lakeside Lakeside Santee Lakeside
<i>Sonoma County</i> L. R. De Chesne	c	Glen Ellen	Glen Ellen
<i>Tulare County</i> California Quarry, McGilvray-Raymond Corp.	a	3 Potrero Ave., San Francisco	Porterville
<i>Ventura County</i> G. W. Dryden	c	Fillmore	Grimes Canyon

a. Granite used in building and monumental stone. c. Granite rock used as flagstone.

GRAPHITE

Operator	Address	Location of plant
California Graphite Co., A. R. Plumb.....	5818 Fayette St., Los Angeles.....	San Francisco Canyon

GYPSUM

Operator	Address	Location of quarry
<i>Fresno County</i> Paoli Gypsum Mine, A. P. Shepard, Mgr.....	3101 Mariposa St., Fresno.....	Mendota
<i>Imperial County</i> Imperial Gypsum Quarry, Pac. Portland Cement.....	111 Sutter St., San Francisco.....	Plaster City
<i>Riverside County</i> E. R. Nonhoff..... U. S. Gypsum Co.....	1116 Ramona St., Corona..... 507 Architects Bldg., Los Angeles.....	Corona Midland

LEAD

Principal Lead Producers in California in 1932

Mine	Operator	Address	Location of mine
<i>Inyo County</i>			
Carbonate.....	J. P. Madison.....	Shoshone.....	Shoshone
Estelle.....	American Smelting and Refining Co.....	McCormick Bldg., Salt Lake City, Utah.....	Keeler
Gold Hill.....	Louise B. Grantham.....	Shoshone.....	Shoshone
Old Mill Schist.....	Lewis McCrea.....	Beatty, Nev.....	Chloride Cliff
Rose & Galena.....	W. R. Honey.....	Box 82, Beatty, Nevada.....	Chloride Cliff
Santa Rosa.....	Santa Rosa Mining and Development Co.....	Keeler.....	Keeler
Shoshone.....	Charles Brown.....	Shoshone.....	Shoshone
<i>Mono County</i>			
Sierra Vista.....	C. R. Graves.....	Benton.....	Benton
<i>Nevada County</i>			
Empress.....	Empress Gold Mining Co.....	Box 914, Grass Valley.....	Grass Valley
Spanish.....	Spanish Mining Co.....	Crocker Bldg., San Francisco.....	Washington
<i>Sierra County</i>			
Sierra-Alaska.....	Sierra-Alaska Mines Co.....	Financial Center Bldg., Oakland.....	Alleghany

LIME AND LIMESTONE

Operator	Product	Address	Location of quarry
<i>Alameda County</i>			
L. H. Beck.....	a, d	P.O. Box 113, Colma.....	Newark
California Chemical Corp.....		Box 8-A, Newark.....	Newark
<i>El Dorado County</i>			
Auburn Chen-jeal Lime Co., Ltd.....	a, b, e	Auburn.....	Newcastle
Diamond Springs Lime Co.....	a, b	Diamond Springs.....	Diamond Springs
El Dorado Limestone Co., J. H. Bell, Mgr.....	b	Shingle Springs.....	Shingle Springs
Pac. Portland Cement Co., Cons.....	b	111 Sutter St., San Francisco.....	Auburn

<i>Fresno County</i>					
Coral Reef Lime Corp., B. F. Mason, Mgr.			Reedley		Reedley
Drake Lime Co., H. E. Drake, Mgr.	c, e		Minkler		Minkler
<i>San Benito County</i>					
San Benito Lime Kilns, A. E. Hamilton	a, b, c		Western Hotel, Hollister		Cienega
<i>San Bernardino County</i>					
Cal. Portland Cement Co.	a		1228 Pac. Mutual Bldg., Los Angeles		Colton
Chubbuck Lime Co., Chas. I. Chubbuck	a, b, c		5000 Worth St., Los Angeles		Chubbuck
Mojave Marl Co.	c		374 Court St., San Bernardino		Wild Siding
Victorville Lime Rock Co.	b		2149 Bay St., Los Angeles		Victorville
<i>San Mateo County</i>					
Pacific Portland Cement Co.	c, d		111 Sutter St., San Francisco		San Mateo
<i>Santa Clara County</i>					
Bay Shell Co.	c, d		519 California St., San Francisco		Alviso
L. H. Beck	c, d		P. O. Box 113, Colma		Alviso
W. B. Ortle Shell Co.	d		Alviso		Alviso
<i>Santa Cruz County</i>					
Henry Cowell Lime and Cement Co., W. H. George, Mgr.	a, b		2 Market St., San Francisco		Santa Cruz
Holmes Lime & Cement Co.	a		Division and De Haro Sts., San Francisco		Felton
Pacific Limestone Prod. Co.	b		Spring St., Santa Cruz		Santa Cruz
Santa Cruz Portland Cement Co.	b		Crocker Bldg., San Francisco		Davenport
<i>Tulare County</i>					
Kaweah Quarries, A. C. Root, Owner	b		Lemoncove		Lemoncove
Valley Lime Co., E. H. McEuen	a		Rt. 1, Box 63A, Lindsay		Lindsay
<i>Tuolumne County</i>					
U. S. Lime Products Corp.	a, b		58 Sutter St., San Francisco		Sonora
Valley Lime Co., E. H. McEuen	b		Rt. 1, Box 63A, Lindsay		Columbia
<i>Ventura County</i>					
Tapo Alta Lime & Fertilizer Co., Mrs. M. L. Franklin, Secy.	d		412 W. 6th St., Los Angeles		Santa Susana

a. Producer of burnt lime. b. Producer of limestone. c. Agricultural lime. d. Shells. e. Marl.

MAGNESITE

Operator	Address	Location of mine
<i>Santa Clara County</i> Sierra Magnesite Co., Lessee, Western Magnesite Mine.....	Box 8A, Newark.....	Red Mountain
<i>Stanislaus County</i> Sierra Magnesite Co., Bald Eagle Mine.....	Box 8A, Newark.....	Gustine

MAGNESIUM SALTS

Operator	Product	Address	Location of plant
<i>San Diego County</i> California Chemical Corp.....	Chloride	Box 8A, Newark.....	San Diego
<i>San Mateo County</i> Marine Chemical Co., R. E. Clarke.....	Carbonate	South San Francisco.....	South San Francisco

MARBLE (Including Onyx and Travertine)

Operator	Product	Address	Location of quarry
<i>Amador County</i> California Carrara Marble, A. G. Dondero	a	2895 3d St., San Francisco	Pine Grove
<i>Santa Barbara County</i> G. Antolini	b	111 E. Gutierrez St., Santa Barbara	Tajiguas
<i>Solano County</i> P. Grassi & Co.	c	1945 San Bruno Ave., San Francisco	Tolenas Springs
Tolenas Springs Onyx, L. Cardini	c	121 14th St., San Francisco	Tolenas Springs
<i>Tuolumne County</i> The Columbia Marble Co., R. H. Van Norden, Secy.	a	413 Rialto Bldg., San Francisco	Columbia

a. Marble. b. Limestone flagstone. c. Onyx and travertine.

MICA

Operator	Address	Mine
<i>Imperial County</i> Micaale, Inc., C. E. Allebrand	2440 E. 56th St., Los Angeles	Ogilly

MINERAL WATER

Operator	Address	Location of spring
<i>Butte County</i> Polk Springs, Wm. D. Polk, Mgr. Richardson Springs, Lee Richardson, Mgr.	Chico Chico	Chico Chico
<i>Calaveras County</i> Mok-Hill Mineral Springs, L. Walkmeister, Prop.	Sutter Creek	Mokelumne Hill
<i>Colusa County</i> Cooks Springs, Fred C. Lewe, Lessee.	Lodoga	Cooks Springs
<i>Contra Costa County</i> Alhambra Water Co.	Martinez	Martinez
<i>Fresno County</i> Mercey Mineral Springs Co., F. J. Bourn, Pres.	810 California Bldg., Los Angeles	Los Banos
<i>Lake County</i> Adams Mineral Springs, Clarence Prather Bartlett Spring Co. Norman Mineral Springs, H. C. Norman, Mgr. Witter Springs, Inc., J. A. Carroll, Pres.	Adams, via Middletown 163 Turk St., San Francisco Middletown 62d and La Salle Sts., Chicago, Ill.	Adams Bartlett Springs Middletown Witter Springs
<i>Los Angeles County</i> Cascade Water Co. Elysian Spring Water Co. Holly Spring Water Magnetic Spring Water Co. Miracle Water Co., Ltd. Mission Spring Water Co. Mountain Spring Water Co. Pure-lax Mineral Water Co. Sparklett Bottled Water Co. Tarzana Mineral Water, San Val Oil and Water Co., Ltd. White Rose Spring Water Co.	4556 York Blvd., Los Angeles 1536 Baxter, Los Angeles 2298 Holly Dr., Los Angeles 936 Palm Ave., Sherman Pantages Theater Bldg., Hollywood 8938 Keith, Hollywood 226 S. Avenue 54, Los Angeles 3640 Griffin, Los Angeles 4500 York Blvd., Los Angeles 416 Palmer Bldg., Los Angeles 4835 Pasadena Ave., Los Angeles	Los Angeles Los Angeles Los Angeles Los Angeles Hollywood Los Angeles Los Angeles Los Angeles Los Angeles Van Nuys Los Angeles
<i>Marin County</i> Purity Spring Water Co.	2032 Kearny St., San Francisco	Sausalito

<i>Napa County</i>					
Calistoga Bottling Works, G. Musante	Calistoga	Calistoga			Calistoga
Napa Soda Springs Co., G. H. T. Jackson	Napa	1142 Mission St., San Francisco			Napa
Napa Vichy Springs, Mrs. John Lepori	Napa	Monticello			Monticello
Samuels Soda Springs, R. J. Little					
Walters Mineral Water, St. Helena Bottling and Cold Storage Co.	St. Helena	St. Helena			Pope Valley
<i>Orange County</i>					
La Vida Mineral Water Co.		804 Spring Arcade Bldg., Los Angeles			Carbon Canyon
<i>Placer County</i>					
Kila-ga Co.	Lincoln	Lincoln			Valley
<i>Riverside County</i>					
Boulah Springs, Oscar C. McNicholl	Arlington	Arlington			Arlington
<i>San Bernardino County</i>					
Arrowhead Hot Springs, California Consolidated Water Co.		1566 E. Washington Blvd., Los Angeles			Arrowhead
<i>San Diego County</i>					
Rock Springs Co., E. S. Walek		R. 2, Box 442, Escondido			Escondido
<i>San Francisco County</i>					
Blue Crest Mineral Water Co.		615 Excelsior Ave., San Francisco			San Francisco
<i>San Luis Obispo County</i>					
Mary Hill Mineral Well Co., Fred Morekel		Paso Robles			Paso Robles
<i>Santa Barbara County</i>					
Veronica Mineral Springs Co.		699 Brannan St., San Francisco			Santa Barbara
<i>Santa Clara County</i>					
San Jose Water Co., C. Wood		389 Willow St., San Jose			Alma
<i>Siskiyou County</i>					
The Shasta Water Co.		6th and Brannan Sts., San Francisco			Dunsmuir
Yreka Coco Cola Bottling Works, Fred J. Meamber, Prop.	Yreka	Yreka			Little Shasta
<i>Sonoma County</i>					
Agua Caliente Springs Co., T. H. Corcoran, Prop.		Agua Caliente			Agua Caliente
Boyes Springs Bottling Works, F. W. Peterson, Mgr.		Boyes Springs			Boyes Springs
Bucal Springs, John Kolling		Preston			Preston
Fetters Mineral Springs, George Fetters		Fetters Springs			Fetters Springs

PLATINUM

Operator		Address	Location of mine
<i>Butte County</i> Shasta-Butte Gold Dredging Co.....		Oroville.....	Oroville.....
<i>Del Norte County</i> Harry H. Wright.....		c/o Adams Station, Crescent City.....	Crescent City.....
<i>Merced County</i> Yuba Consolidated Gold Fields.....		351 California St., San Francisco.....	Snelling.....
<i>Sacramento County</i> Capital Dredging Co..... Natomas Co.....		Balfour Bldg., San Francisco..... Forum Bldg., Sacramento.....	Folsom Natomas
<i>Shasta County</i> Gas Point Dredge, Staheli & Cerney.....		Box 127, Anderson.....	Gas Point.....
<i>Stanislaus County</i> La Grange Gold Dredging Co.....		Mills Bldg., San Francisco.....	La Grange.....

POTASH

Operator		Address	Location of plant
<i>San Bernardino County</i> American Potash and Chemical Co.....		Trona.....	Trona.....

PUMICE OR VOLCANIC ASH

Operator	Product	Address	Location of quarry
<i>Fresno County</i> Earlomite Mining Co., L. T. Bennett and Earl Bennett Fort Miller Pumicite, A. H. McKenzie Estate	b b	P. O. Box 474, Selma Wishon Ave., Fresno	Friant Friant
<i>Imperial County</i> The Kalite Co., O. J. Salisbury	a	90 Oak Knoll Ave., Los Angeles	Calipatria
<i>Inyo County</i> Chas. Brown Tonopah & Tidewater Ry. Victorville Lime Rock Co.	a b a	Shoshone 1014 Central Bldg., Los Angeles 2149 Bay St., Los Angeles	Shoshone Shoshone Coso Junction
<i>Kern County</i> Cudahy Packing Co.	b	803 Macy St., Los Angeles	Cenada
<i>Mono County</i> California Quarries Corp.	a	1300 Quinby Bldg., Los Angeles	Laws
<i>Napa County</i> Pumice Products Co. of California, Geo. Smith	a	3036 Bartlett St., Oakland	Monticello
<i>San Luis Obispo County</i> Golden State Cleaner Mine, M. L. Francis	b	Creston	Creston
<i>Sonoma County</i> Frazier Bros. Property, A. W. Frazier	b	2912 Adeline St., Berkeley	Trinity

a. Pumice. b. Volcanic ash. c. Scoria.

PYRITE

Operator	Product	Address	Location of mine
<i>Alameda County</i> Leona Chemical Co., D. A. McDonnell		Syndicate Bldg., Oakland	Leona Heights

QUICKSILVER

Principal Quicksilver Producers in California for 1932

Mine	Operator	Address	Location of mine
<i>Colusa County</i>			
Manzanita	Western Mergers Mine Co., Geo. Newhall, Pres.	260 California St., San Francisco	Wilbur Springs
<i>Contra Costa County</i>			
Ryne	Mt. Diablo Quicksilver Co., Ltd., Bloom- berg, Moni & Jackson	2926 Telegraph Ave., Berkeley	Clayton
<i>Fresno County</i>			
Archer	Joseph Boyles & Sons	Coalinga	Coalinga
Mercy	W. G. Incl.	Box 123, South Dos Palos	Mercy Hot Springs
<i>Lake County</i>			
Anderson	E. N. Schwartz	Lakeport	Anderson Springs
Big Chief	L. R. Messer	Middletown	Anderson Springs
Great Western	Bunsted Mining Co., E. J. Bunsted, Mgr.	Middletown	Middletown
Helen	H. W. Gould	Mills Bldg., San Francisco	Middletown
Knoter	John Jags	Lower Lake	Lower Lake
Mirabel	Mirabel Quicksilver Co., J. W. Doman, Supt.	Middletown	Middletown
Sulphur Bank	Sulphur Bank Syndicate, W. Brailey, Mgr.	Crocker Bldg., San Francisco	Lower Lake
Wilkenson Bros.	E. J. Wilkenson	Middletown	Middletown
<i>Napa County</i>			
Actna	D. S. Llewellyn	Actna Springs	Actna Springs
James Creek Placer	E. J. Barnett	1071 57th St., Oakland, Cal.	James Creek
Bella Oaks	H. W. Gould & Co.	Mills Bldg., San Francisco	Rutherford
Ivanhoe	Harry Patten	Calistoga	Gottville
Knoxville	Geo. E. Gamble	Monticello	Monticello
La Joya	H. W. Gould	Mills Bldg., San Francisco	Oakville
Oak Hill	Acme Mining & Milling Co.	Alto Bldg., San Francisco	Oak Hill

<i>San Benito County</i>				
Alpine	Harry B. Leonard	Hollister	Hernandez	
Aurora	W. S. Brinard	Idria	Idria	
Breen	Peter Buol	4845 Angeles Vista Blvd., Los Angeles	Idria	
New Idria	New Idria Quicksilver Mines, Inc.	Merchants Exchange Bldg., San Francisco	Idria	
Stayton	R. B. Knox	Hollister	Hollister	
Wonder	G/o. W. McCutcheon	c/o Sampson Magnesite Mine, Tres Pinos	Tres Pinos	
<i>San Luis Obispo County</i>				
Cambria	Hamilton Carhartt, Jr.	535 S. Calalena Ave., Pasadena	Cambria	
Carson & Capitola	Ellard W. Carson	San Luis Obispo	Adelaida	
Deer Trail	The Alamo Mercury Corp., J. C. Freeman	873 Church St., San Luis Obispo	Huasna	
Little Bonanza	E. Merrifield	786 Higuera St., San Luis Obispo	Adelaida	
Oceanic	Consolidated Metals Corp.	Mills Bldg., San Francisco	Cambria	
Rincónada	Mercury Corp. of America, Ltd.	Box 537, Santa Monica	Santa Margarita	
<i>Santa Barbara County</i>				
Frediana	Frediana Mining Co., J. C. Peterson	McKittrick	Solvange	
Red Rock	Hanno & Hunze Mining Co.	Solvange	Los Prietos	
Los Prietos	Edgar R. Larson	Hotel De Rivera, Santa Barbara		
<i>Santa Clara County</i>				
Guadalupe (dump)	A. E. Golden	Los Gatos	Los Gatos	
New Almaden (dump)	Ben Black	Almaden	Almaden	
New Almaden (dump)	F. P. Hauck & E. Hernandez	San Jose	Almaden	
<i>Siskiyou County</i>				
Great Northern	Mercury Mines, Eugene Aureguy	Mills Bldg., San Francisco	Gottville	
<i>Sonoma County</i>				
Cloverdale	J. J. Cortelyou	Cloverdale	Cloverdale	
Cloverdale	Cavagnaro & Schor	Cloverdale	Cloverdale	
Contact	J. E. Grover	Pine Flat	Pine Flat	
Culver Bear	Davey Mining Co., H. C. Davey	Cloverdale	Cloverdale	
<i>Trinity County</i>				
Altoona	Altoona Quicksilver Mining Co., J. Frowenfeld, Pres.	2446 Washington St., San Francisco	Castella	

SALT

Operator	Address	Location of plant
<i>Alameda County</i> Arden Salt Co. California et al. Plants, Leslie-California Salt Co.	225 Bush St., San Francisco 149 California St., San Francisco	Newark and Mt. Eden Alvarado
<i>Kern County</i> Consolidated Salt Co.	P. O. Box 28, Long Beach	Sahdala
<i>Los Angeles County</i> Long Beach Salt Co.	P. O. Box 28, Long Beach	Long Beach
<i>Modoc County</i> Surprise Valley Salt Works, Joshua H. Hutchinson	Cedarville	Lake City
<i>Monterey County</i> Monterey Bay Salt Co., E. C. Vierra, Mgr.	Moss Landing	Moss Landing
<i>San Bernardino County</i> California Rock-Salt Co. Saline Products, Inc.	2465 Hunter St., Los Angeles 2000 Santa Fe Ave., Los Angeles	Amboy Amboy
<i>San Diego County</i> Western Salt Co.	917 J. D. Spreckels Bldg., San Diego	San Diego
<i>San Mateo County</i> Stauffer Chemical Co.	636 California St., San Francisco	Redwood City

SANDSTONE

Operator		Address	Location of quarry
<i>Los Angeles County</i> Binder Bros., W. H. Binder		285 N. Lake Ave., Pasadena	Boquet Canyon
<i>Monterey County</i> Santa Lucia Quarries, Ltd., John Bathen Sierra Quarry, Harry Rogers		Carmel Box 136, Carmel	Carmel Carmel
<i>Napa County</i> H. F. Galbreath		1742 Solano St., Berkeley	
<i>San Luis Obispo County</i> Santa Rosa Creek Quarry, Mora Bros.		Cambria, Box 121	Cambria

SILICA

Operator	Product	Address	Location of mine
<i>Contra Costa County</i> Silica Co. of California, Ltd.	b	Brentwood	Brentwood
<i>El Dorado County</i> Snow Silica Deposit Spicky Polish Corp., Owners	a	1401 3d St., San Francisco	Placerville
<i>Inyo County</i> Inyo Marble Co.	c	361 N. Ave. 22, Los Angeles	Lone Pine
<i>Monterey County</i> Del Monte Products, A. J. Gunnell	b	Crocker Bldg., San Francisco	Del Monte
<i>Riverside County</i> American Enecaustic T. Co. P. J. Weisel	a b	52d and S. Alameda Sts., Los Angeles La Habra	Murrietta Corona
<i>San Bernardino County</i> Dr. J. Von Gal-Scale	a	618 S. Bixel St., Los Angeles	
<i>San Diego County</i> Mineral Milling Co. Standard Sanitary Mfg. Co., R. P. Jones, Mgr.	a a	1081 Richmond St., Los Angeles Campo	White Oak Springs Campo

a. Quartz. b. Glass sand. c. Quartzite.

SILLIMANITE—ANDALUSITE—CYANITE GROUP

Operator	Product	Address	Location of mine
<i>Imperial County</i> Vitrefrax Corp.-----	Cyanite	5050 Pacific St., Vernon, Los Angeles-----	Ogilby
<i>Mono County</i> Champion Porcelain Co., Dr. J. A. Jeffery, Pres.-----	Andalusite	Butler Ave., and Grand Trunk R.R., Detroit, Mich.-----	Mocalno

SILVER

Principal Silver Producers in California in 1932

Mine	Type of mine	Operator	Address	Location of mine
<i>Anador County</i>				
Argonaut	a	Argonaut Mining Co.	Jackson	Jackson
Kennedy	a	Kennedy Mining & Milling Co.	519 California St., San Francisco	Martell
Old Eureka & Summit	a	Central Eureka Mining Co.	Hunter-Dubin Bldg., San Francisco	Sutter Creek
<i>Butte County</i>				
Las Plumas	a	J. Wilson Reno & C. N. Erickson Co. Ltd.	Yankee Hill	Yankee Hill
<i>Inyo County</i>				
Carbonate	c	J. P. Madison	Shoshone	Shoshone
Estelle	c	American Smelting & Refining Co.	McCormick Bldg., Salt Lake City, Utah	Keeler
Gold Hill	c	Louise B. Grantham	Shoshone	Shoshone
Santa Rosa	c	Santa Rosa Mining & Development Co.	Keeler	Keeler
<i>Kern County</i>				
Elephant	a	Bert Fisher, J. S. Harper and Paul Stapler	Mojave	Mojave
Standard	a	Standard Mining & Milling Co.	Mojave	Mojave
Tropico	a	Burton Bros., Inc., Lessees Tropico Mine	Rosamond	Rosamond
Yellow Aster	a	Yellow Aster Mining & Milling Co.	Randsburg	Randsburg
<i>Merced County</i>				
Merced Unit	a	Yuba Consolidated Goldfields	351 California St., San Francisco	Snelling
<i>Mono County</i>				
Comanche	b	C. R. Graves	Benton	Benton
<i>Nevada County</i>				
Empire and North Star	a	Empire-Star Mines Co., Ltd.	Rm. 1507-14 Wall St., New York, N. Y.	Grass Valley
Empress	a	Empress Gold Mining Co.	Box 914, Grass Valley	Grass Valley
Golden Center	a	Cooley Butler	Rowan Bldg., Los Angeles	Grass Valley
Idaho-Maryland	a	Idaho-Maryland Mines Co.	Russ Bldg., San Francisco	Grass Valley
Spanish		Spanish Mining Co.	Crocker Bldg., San Francisco	Washington

<i>Plumas County</i> Walker.....	d	Walker Mining Co.....	820 Kearns Bldg., Salt Lake City, Utah	Spring Garden
<i>Sacramento County</i> Capital.....	a	Capital Dredging Co.....	Balfour Bldg., San Francisco	Folsom
Natomas.....	a	Natomas Co.....	Forum Bldg., Sacramento	Natomas
<i>San Bernardino County</i> Kelly and Santa Fe groups.....	a	Red Mountain Mines Syndicate.....	Red Mountain.....	Randsburg
<i>Shasta County</i> Iron Mountain.....		The Mountain Copper Co., Ltd.....	112 Market St., San Francisco	Matheson
<i>Sierra County</i> Sierra-Alaska.....	a	Sierra-Alaska Mining Co.....	Financial Center Bldg., Oakland	Allegany

a. Gold. b. Silver. c. Silver-Lead. d. Copper.
*Taken over by the Empire-Star Mines Co., Ltd.

SLATE

Operator		Address	Location of quarry
<i>El Dorado County</i> Pacific Minerals Co., Ltd.....		332 10th St., Richmond	Chili Bar
<i>Inyo County</i> Samuel A. White & R. B. McIlroy.....		1207 Damon Ave., Anaheim	Big Pine
<i>Tuolumne County</i> Wirney Slate Quarry, W. S. McLean.....		1919 San Bruno Ave., San Francisco	Hetch Hetchy

SOAPSTONE AND TALC

Operator	Product	Address	Location of mine
<i>Butte County</i> McLean Talc Deposit, W. S. McLean	a	1919 San Bruno Ave., San Francisco	McLean Spur
<i>El Dorado County</i> Pacific Minerals Co., Ltd., Chas. S. Renwick	a	337 10th St., Richmond	Shrub
<i>Inyo County</i> Sierra Talc Co., Franklin Booth, Mgr.	b	428 Union League Bldg., Los Angeles	Keeler
<i>San Bernardino County</i> Pacific Coast Talc Co.	b	2149 Bay St., Los Angeles	Silver Lake
<i>Western Talc Co.</i>	b	1901 E. Slauson Ave., Los Angeles	Acme
<i>Tuolumne County</i> John L. Witney	a	Jamestown	Jamestown

a. Soapstone. b. Talc.

SODA

Operator	Product	Address	Location of plant
<i>Inyo County</i> Natural Soda Products Co., W. W. Waterson Pacific Alkali Co.		650 S. Spring St., Los Angeles 1206 Pacific Mutual Bldg., Los Angeles	Keeler Bartlett
<i>San Bernardino County</i> West End Chemical Co.		West End	Searles Lake

STONE, MISCELLANEOUS

Under the heading of stone, miscellaneous, there are four divisions—crushed rock, grinding mill pebbles, paving blocks, and sand and gravel. Crushed rock includes all crushed rock that is used in macadam, ballast and for concrete; also rock used for rubble and riprap.

NOTE.—The California State Highway Commission produces both crushed rock and sand and gravel in various places in the State used in construction and maintenance of highways, but not specified in this listing.

Operator	Product	Address	Location of pit or quarry
<i>Alameda County</i>			
Hanfen Trucking Co.	a	Pleasanton	Pleasanton
Hayward Building Materials Co.	a, b	Arlerton and Jackson Sts., Hayward	Hayward
Heafey-Moore Co., Leona Quarry	b	344 High St., Oakland	Oakland
Otto Hirsch	a	Irrington	Irrington
C. Jorgensen, Red Rock Quarry	b	Castro Valley Rd., Hayward	Hayward
Kaiser Paving Co.	a	1522 Latham Square Bldg., Oakland	Eliot
P. R. King	a	San Lorenzo	San Lorenzo
Langdon Molding Sand, J. H. Langdon	c	R.F.D., Box 89, Niles	Decoto
Red Shale Quarry, W. S. McLean	d	1919 San Bruno Ave., San Francisco	Arroyo Mocho
Pacific Coast Aggregates, Inc.	a, b	85 2d St., San Francisco	Eliot and Niles
Alfred W. Petersen	a	P.O. Box 943, Livermore	Livermore
Ramos Quarry, Ramos Bros.	a	C and 7th Sts., Hayward	Hayward
San Leandro Rock Co., Lake Chabot Quarry	b	1273 Foothill Blvd., San Leandro	Lake Chabot
Southern Pacific R.R. Co.	a	Southern Pacific Bldg., San Francisco	Niles, Radium and Livermore
<i>Amador County</i>			
Amador County	a, b	Jackson	
<i>Butte County</i>			
Butte County	a, b	Oroville	Oroville
Bechtel-Kaiser Co., R. J. Kennedy, Mgr.	a, b	Oroville	Cherokee Flat
Cherokee Sand and Gravel Co., C. W. & E. E. Myers	a	R. 4, Box 127, Chico	Oroville
Lort & Bishop	a, b	Box 335, Oroville	McLean Spur
McLean Quarry, W. S. McLean	d	1919 San Bruno Ave., San Francisco	Oroville
Pacific Coast Aggregates, Inc.	a, b	85 2d St., San Francisco	
<i>Calaveras County</i>			
Calaveras County	a	San Andreas	Angels
Pacific Minerals Co., Ltd.	d	337 10th St., Richmond	

<i>Colusa County</i>					
<i>Colusa County</i>				Colusa	
<i>Contra Costa County</i>					
<i>Contra Costa County</i>				Martinez	
Antioch Sand Co.				312 Loew Bldg., San Francisco	Antioch
Blake Bros. Co., Anson S. Blake				204 Balboa Bldg., San Francisco	Point Richmond
Hutchinson Co., Stege Quarry				1450 Harrison St., Oakland	Stege
Oak Point Sand Co., Robert P. Easley				Antioch	Antioch
Thomas G. Roberts				Pittsburg	Norcrossville
Silico Co. of Calif., Ltd.				Merchants Exchange Bldg., San Francisco	Brentwood
<i>Del Norte County</i>					
<i>Del Norte County</i>				Crescent City	
<i>El Dorado County</i>					
<i>El Dorado County</i>				Placerville	Georgetown
Diamond Springs Lime Co.				Diamond Springs	Diamond Springs
U. S. Forest Service				Ferry Bldg., San Francisco	
<i>Fresno County</i>					
Grant-Service Rock Co., Cons.				T. W. Patterson Bldg., Fresno	El Prado
Pacific Coast Aggregates, Inc.				85 2d St., San Francisco	Pedra
<i>Glenn County</i>					
<i>Southern Pacific Co.</i>				65 Market St., San Francisco	Wyo
<i>Humboldt County</i>					
<i>Humboldt County</i>				Eureka	
Benbow Rock and Gravel Co.				Garberville	Garberville
J. Ferguson				Arcata, R.F.D.	Arcata
Hennstreet & Bell				411 C St., Marysville	
Northwestern Pacific R.R. Co., Wm. N. Neff, Gen. Supt.				Sausalito	South Fork
U. S. Bureau of Public Roads				Sheldon Bldg., San Francisco	
<i>Imperial County</i>					
<i>Imperial County</i>				El Centro	
Imperial Irrigation Dist., Gen. Supt. River Div.				Andrade	Andrade
Imperial Rock Corp.				P.O. Box 6, Niland	Niland
S. E. Layman				Holtville	Holtville

a. Sand and gravel. b. Crushed rock (macadam, ballast, rubble, riprap, etc.). c. Molding sand. d. Granules for roofing, terrazzo. e. Slag. f. Tube mill pebbles. g. Decomposed granite.

STONE, MISCELLANEOUS—Continued

Under the heading of stone, miscellaneous, there are four divisions—crushed rock, grinding mill pebbles, paving blocks, and sand and gravel. Crushed rock includes all crushed rock that is used in macadam, ballast and for concrete; also rock used for rubble and riprap.

Operator	Product	Address	Location of pit or quarry
<i>Inyo County</i>			
Inyo County	a	Independence	Lone Pine
Inyo Marble Co.	b, d	406 S. Main St., Los Angeles	
<i>Kern County</i>			
Kern County	a	Bakersfield	
Bakersfield Rock and Gravel Co.	a, b, h	Box 395, Station A, Bakersfield	
Kern Rock Co., Ltd.	a	P.O. Box 1697, Bakersfield	Kern River
<i>Lake County</i>			
Lake County	a	Lakeport	
Jim Gunn, Jr.	a	Kelseyville	Kelseyville
Chas. Kuppinger	a, b	Lakeport	Lakeport
<i>Lassen County</i>			
Lassen County	a	Susanville	
<i>Los Angeles County</i>			
A. T. & S. F. R.R., I. L. Hibbard, Gen. Mgr.	a	609 Kereckhoff Bldg., Los Angeles	Forbes
Richard R. Ball	a	Box 233, WALTERIA	Walteria
Bengal & Sons	a	1709 Monte Vista, Pasadena	Pasadena
Blue Diamond Corp., Ltd.	a	1650 S. Alameda St., Los Angeles	El Monte and Roseme
Wm. J. Bonfield	g	2008 Laurel Canyon Rd., Los Angeles	Hollywood
Consolidated Rock Products Co.	a, b	656 S. Los Angeles St., Los Angeles	Whittier and Fullerton
Ducey & Atwood Rock Co., R. K. Atwood, Pres.	a, b	Box 194, East Pasadena	East Pasadena
Eaton Canyon Rock and Sand Co.	a, b	2350 E. Colorado St., Pasadena	Pasadena
Graham Bros.	a, b, g	Long Beach	Catalina Island and Roseme, El Monte and Rancho Quia's

Ed. Johnson & Sons	a, b	451 S. Sunset	Tujunga
Lindauer Corp.	a	Box 208, La Habra	La Habra
Los Angeles Harbor Dept., Bureau of Maintenance	b	City Hall, San Pedro	Santa Catalina
Los Angeles Decomposed Granite Co.	g	2171 W. Washington, Los Angeles	
Reynolds Crushed Gravel	b, g	920 N. Humphreys Ave., Los Angeles	Los Angeles
Santa Catalina Island Co.	a, b, g	Avalon	Santa Catalina Island
Edwin Sidebotham & Son, Inc., Sidebotham Sand Plant	a	McFarland and L Sts., Wilmington	Lomita
State Decomposed Granite Co.	g	2272 Laurel Canyon Blvd., Los Angeles	Hollywood
<i>Madera County</i>			
Madera County	a, g	Madera	
<i>Marin County</i>			
Marin County	a	San Rafael	San Rafael
Daniels Con. Co.	b	503 Market St., San Francisco	
Hutchison Company	b	1450 Harrison St., Oakland	San Quentin
<i>Mariposa County</i>			
Mariposa County	a	Mariposa	Bagby
Kelm Jasper Quarry, H. J. Kelm	d	Merced Falls	Yosemite Park
U. S. Bureau of Public Roads	a, b	Sheldon Bldg., San Francisco	Yosemite Ntl. Park
Yosemite National Park	a, b	Yosemite	
<i>Mendocino County</i>			
Mendocino County	a	Ukiah	Ukiah
Ukiah Gravel & Cement Co., John Freitas	a	Ukiah	
<i>Merced County</i>			
Merced County	a	Merced	Los Banos
J. W. Huffman, Bair Creek Gravel Pit	a	Merced	Merced
<i>Modoc County</i>			
Modoc County	a	Alturas	Alturas
The Renshaw Sand, Rock & Gravel Co.	a	Alturas	Mammoth
Great Northern Railway, P. F. Dixon, Supt.	b	Klamath Falls, Ore.	
Hemstreet & Bell	b	411 C St., Marysville	
Southern Pacific Co.	a	65 Market St., San Francisco	Stronghold
U. S. Bureau of Public Roads	b	Sheldon Bldg., San Francisco	
<i>Mono County</i>			
California Quarries Corp.	a	1300 Quimby Bldg., Los Angeles	Laws

a. Sand and gravel. b. Crushed rock (macadam, ballast, rubble, riprap, etc.). c. Molding sand. d. Granules for roofing, terrazzo. e. Slag. f. Tube mill pebbles. g. Decomposed granite. h. Earth.

STONE, MISCELLANEOUS—Continued

Under the heading of stone, miscellaneous, there are four divisions—crushed rock, grinding mill pebbles, paving blocks, and sand and gravel. Crushed rock includes all crushed rock that is used in macadam, ballast and for concrete; also rock used for rubble and riprap.

Operator	Product	Address	Location of pit or quarry
<i>Monterey County</i>			
Del Monte Properties, A. J. Gunnell	a, c	401 Crocker Bldg., San Francisco	Pacific Grove
Wm. Machado	a	Box 424, Carmel	Carmel
Monterey Sand Co.	a, c	Monterey	Monterey
M. J. Murphy	a, b	Monte Verde and 9th Sts., Carmel	Carmel
Pacific Coast Aggregates, Inc.	a	85 2d St., San Francisco	Lapis and Pratteo
S. Ruthven, Seaside Sand Pit	a	Seaside	Seaside
Southern Pacific Co.	a	65 Market St., San Francisco	Lapis
<i>Napa County</i>			
Napa County	a, b	Napa	Napa
Basalt Rock Co.	b	8th St., Napa	Napa
John Cassaretto	a	6th and Channel Sts., San Francisco	Napa
Errington Quarry, Ray Errington	a	Napa	Napa
Napa & Calistoga S. F. R.R., Butala Gravel Pit	a	Napa	St. Helena
Thorsen Gravel Pit, Harry Thorsen	a	St. Helena	St. Helena
<i>Nevada County</i>			
Nevada County	b	Nevada City	
<i>Orange County</i>			
Orange County	g	Santa Ana	San Juan Capistrano
Capistrano Rock & Sand Co.	a, b	Box 67, Doheny Park	Whittier and Fullerton
Consolidated Rock Products Co.	a, b	656 S. Los Angeles St., Los Angeles	El Modena
Graham Bros.	a, b	Long Beach	Garden Grove
A. J. Jorgensen	a	Garden Grove	Santa Ana
National Cement Pipe Co.	a	Drawer K, Santa Ana	Santa Ana
Reynolds Gravel Service	g	715 Hickory St., Santa Ana	Garden Grove
Spurlock Sand Pit	a	Garden Grove	Anaheim
B. A. Stoffel	a	Anaheim	

<i>Placer County</i>			
Placer County		Auburn	Coon Creek
Hemstreet & Bell	a	411 C St., Marysville	Lincoln
Lincoln Arcade Sand Co.	b	Lincoln	Rocklin
A. Pernu Granite Quarries, Adolph Pernu	a	Rocklin	Rocklin
Union Granite Co., Mat Rubkala	b	Rocklin	
<i>Plumas County</i>			
U. S. Bureau of Public Roads	b	Sheldon Bldg., San Francisco	
<i>Riverside County</i>			
Riverside County	a	Court House, Riverside	Thermal
Graham Bros.	b	Long Beach	Bly Junction
Künpe-Hausser Construction Co., Ormand Quarry	b	Rt. 2, Riverside	Corona
Kuster & Waterburg	a	Corona	Crestmore
Los Angeles & Salt Lake R.R.	a	Pacific Electric Bldg., Los Angeles	Riverside
Mutual Rock & Gravel Co.	a	Riverside	Grand Terrace
Nevada-Pacific Mineral Co., Inc.	c	3363 Fruitland Rd., Los Angeles	Perris
W. C. Ricketts, Ricketts Quarry	b	Box 37-B, Perris	Riverside
City of Riverside	b	Riverside	Riverside
The Service Gravel Co., F. A. Braman	a	4324 10th St., Riverside	Corona
P. J. Weisel, Industrial Sands	a, c	La Habra	
<i>Sacramento County</i>			
Cannon & Co.	c	Box 281, Sacramento	Ben Ali
Del Paso Rock and Gravel Co.	a, b	H St. Rd., Sacramento	Del Paso
Pacific Coast Aggregates, Inc.	a, b	85 2d St., San Francisco	Fair Oaks, Mayhew and American River
Perkins Gravel Co.	a	Perkins	Perkins
<i>San Benito County</i>			
San Benito County	a, b	Hollister	Logan
Granite Rock Co.	b	Drawer M, Watsonville	Logan
Southern Pacific Co.	a, b	65 Market St., San Francisco	
<i>San Bernardino County</i>			
Consolidated Rock Products Co.	a, b	656 S. Los Angeles St., Los Angeles	S. Fontana
Deceyville Stone Co., Ltd.	b	Box 698, San Pedro	La Verne
Hanawalt Bros.	a, b	2151 D St., La Verne	Barstow
Pacific Minerals, Inc.	d	337 10th St., Richmond	Redlands
Pinneys Sand & Rock Service	a, b	Redlands	Redland's
Redlands Gravel Co.	a, b	Redlands	San Bernardino
San Bernardino Rock and Gravel Co.	a	San Bernardino	San Bernardino
Triangle Rock & Gravel Co.	a, b	P.O. Box 34, San Bernardino	

a. Sand and gravel. b. Crushed rock (macadam, ballast, rubble, riprap, etc.). c. Molding sand. d. Granules for roofing, terrazzo. e. Slag. f. Tube mill pebbles. g. Decomposed granite.

STONE, MISCELLANEOUS—Continued

Under the heading of stone, miscellaneous, there are four divisions—crushed rock, grinding mill pebbles, paving blocks, and sand and gravel. Crushed rock includes all crushed rock that is used in macadam, ballast and for concrete; also rock used for rubble and riprap.

Operator	Product	Address	Location of pit or quarry
<i>San Diego County</i>			
Calavera Rock Corp.	b	Oceanside	Oceanside
Canyon Rock Co.	a, b	3911 5th Ave., San Diego	San Diego
Crystal Silica Sand Co.	a	Oceanside	Oceanside
H. G. Fenton Material Co.	a	13th and Imperial Ave., San Diego	San Diego
R. M. Hubbard	c	406 W. Nutmeg St., San Diego	San Diego
John T. Morand	f	Box 381, Carlsbad	Oceanside
Nelson & Sloan	a	P.O. Box 832, Chula Vista	Chula Vista
Oceanside Rock & Sand Co.	a	Carlsbad	Oceanside
<i>San Francisco County</i>			
Mission Quarry Co.	b	210 Balboa Bldg., San Francisco	San Francisco
<i>San Joaquin County</i>			
San Joaquin County	a	Stockton	Tracy
Frank Marks	a, b	Newman	Riverbank
Pacific Coast Aggregates, Inc.	a, b	85 2d St., San Francisco	Escalon
Santa Fe Sand and Gravel Co., W. A. Arlington	a	P.O. Box 271, Escalon	
<i>San Luis Obispo County</i>			
San Luis Obispo County	a, b	San Luis Obispo	
Cambria Development Co.	a	Cambria	Cambria
Guiton Molding Sand, Harold E. Guiton	c	Oceano	Oceano
<i>San Mateo County</i>			
San Mateo County	b	Redwood City	Belmont Park
C. E. Ashley, Skyline Quarry	b	Belmont Park	
H. E. Casey Co.	b	3d and B Sts., San Mateo	
M. F. Curha, Vasques Quarry	b	Main St., Half Moon Bay	Half Moon Bay
Half Moon Bay Feed & Fuel Co., Torpy Quarry	b	Half Moon Bay	Half Moon Bay
Holy Cross Cemetery	b	Colma	Colma
Industrial Mineral Products, W. B. Vestal	c	970 7th St., San Francisco	
Market St. Ry. Co., Daly's Quarry	b	58 Sutter St., San Francisco	Daly
Ratterree Bros. Co.	b	400 Walbridge Blvd., San Francisco	South San Francisco

STONE, MISCELLANEOUS—Continued

Under the heading of stone, miscellaneous, there are four divisions—crushed rock, grinding mill pebbles, paving blocks, and sand and gravel. Crushed rock includes all crushed rock that is used in macadam, ballast and for concrete; also rock used for rubble and riprap.

Operator	Product	Address	Location of pit or quarry
<i>Solano County</i>			
Solano County	a	Fairfield	Cordelia
J. M. Nelson, Cordelia Quarry	b	Cordelia	
<i>Sonoma County</i>			
Sonoma County	a, b	Santa Rosa	Healdsburg
Basalt Rock Co.	a	8th St., Napa	Glen Ellen
S. Cabrol	b	Glen Ellen	Geyserville
Commercial Gravel Co., H. C. Burrows	a	530 Mills Bldg., San Francisco	Petaluma
Hein Bros. Basalt Rock Co., Mark Hein, Pres.	b	Petaluma	Shellville
Helberg Gravel Plant	a	Rt. 1, Sonoma	Forestville
Independent Gravel Co.	a	Forestville	Mirabel
Mirabel Gravel Co., S. Caugres	a	222 3d St., San Rafael	Stony Point
Petaluma and Santa Rosa, E. R. R., E. H. Maggard, Mgr.	b	Petaluma	Stony Point
Stony Point Quarry, W. A. Wilson	b	Petaluma, Star Rt.	
<i>Stanislaus County</i>			
Atlas Olympia Co.	a	209 Underwood Bldg., San Francisco	Orange Blossom
W. Haslan	a	Oakdale	Oakdale
Frank B. Marks	a, b	Newman	Crows Landing
W. S. McLean	d	1919 San Bruno Ave., San Francisco	Knights Ferry
Oakdale Irrigation Dist., M. E. Robinson, Auditor	a	Oakdale	Oakdale
Putman Sand & Gravel Co.	a	Modesto	Modesto
Rinehart Sand Pit, Rinehart Bros.	a	Modesto	Modesto
J. P. Seaton, Seaton Gravel Pit	a	Patterson	Crows Landing
Service Bros. Gravel Plant	a, b	Waterford	Waterford
Southern Pacific Co.	a	65 Market St., San Francisco	Newman
<i>Tehama County</i>			
Tehama County	a, b	Red Bluff	Red Bluff
Taber Bros.	a	Red Bluff	
U. S. Bureau of Public Roads	b	461 Market St., San Francisco	

<i>Trinity County</i>					
Trinity County			Weaverville		Weaverville
Roy Eastwood		a	Weaverville		
U. S. Forest Service		a	Ferry Bldg., San Francisco		
<i>Tulare County</i>					
Tulare County		g	Visalia		
J. J. Duggan		a	Porterville		Porterville
Porterville Cement Pipe Co.		a	P.O. Box 396, Porterville		Porterville
O. C. Jeffers		a	Star Rt. 2, Porterville		Porterville
Nelson Concrete Pipe Co., John Nelson		a	Porterville		Porterville
Supt. Sequoia Natl. Park		a, b	Three Rivers		Sequoia Natl. Park
Tulare Rock Co., O. Holliday		a, b	Lindsay		Lindsay
U. S. Bureau of Public Roads		b	411 Market St., San Francisco		Sequoia Park
<i>Tuolumne County</i>					
McLean Quarry, W. S. McLean		d	1919 San Bruno Ave., San Francisco		Sonora
<i>Ventura County</i>					
Ventura County		b	Ventura		
El Rio Rock Co.		a, b	P.O. Box 384, Ventura		El Rio
Fillmore Rock Co.		a, b	Fillmore		Fillmore
Piru Rock Co.		a, b	Piru		Piru
Santa Clara Sand and Gravel Co.		a	2027 E. Main St., Ventura		Ventura
Santa Paula Rock Co.		a	Willard Bridge, Santa Paula		Santa Paula
Saticoy Rock Products Co.		a, b	Saticoy		Saticoy-Ventura
Ventura Velvet Molding Sand, Chas. A. Cole		c	1355 Church St., Ventura		Ventura
Southern Pacific Co.		a, b	65 Market St., San Francisco		Rockbank
<i>Yolo County</i>					
Yolo County		a	Woodland		
C. and H. Gravel Co., J. J. Hartley		a	Davis		Davis
Yolo Gravel Co.		a	P.O. Box 7, Yolo		Yolo
<i>Yuba County</i>					
Hemstreet & Bell		a, b	411 C St., Marysville		Marysville
Pacific Coast Aggregates, Inc.		a	85 2d St., San Francisco		Marysville
Yuba River Sand Co.		a	Marysville		

a. Sand and gravel. b. Crushed rock (macadam, ballast, rubble, riprap, etc.). c. Molding sand. d. Granules for roofing, terrazzo. e. Decomposed granite.

SULPHUR

Operator		Address	Location of mine
<i>Inyo County</i> Crater Sulphur Deposit, Morris Albertali		Big Pine	Last Chance Mountain

TUNGSTEN

Operator		Address	Location of mine
<i>El Dorado County</i> Comeback Cons. Tungsten Mine, B. F. Magee & Lee Wolfe	m	Georgetown	Placerville
<i>Tulare County</i> Kennedy Tungsten Mine, J. H. Kennedy	s	Posy	Posy

m. Mined and shipped. s. Made shipments of material mined previous to 1932.

APPENDIX

MINING BUREAU ACT

Chap. 679 [Stats. 1913]; amended, Chap. 280 [Stats. 1929]; amended, Chap. 748 [Stats. 1933].

An act establishing a state mining bureau, creating the office of state mineralogist, fixing his salary and prescribing his powers and duties; providing for the employment of officers and employees of said bureau, making it the duty of persons in charge of mines, mining operations and quarries to make certain reports, providing for the investigation of mining operations, dealings and transactions and the prosecution for defrauding, swindling and cheating therein, creating a state mining bureau fund for the purpose of carrying out the provisions of this act and repealing an act entitled "An act to provide for the establishment, maintenance, and support of a bureau, to be known as the state mining bureau, and for the appointment and duties of a board of trustees, to be known as the board of trustees of the state mining bureau, who shall have the direction, management and control of said state mining bureau, and to provide for the appointment, duties, and compensation of a state mineralogist, who shall perform the duties of his office under the control, direction and supervision of the board of trustees of the state mining bureau," approved March 23, 1893, and all acts amendatory thereof and supplemental thereto or in conflict herewith.

[Approved June 16, 1913. In effect August 10, 1913.]

[Amendment (Sec. 16) approved May 14, 1929. In effect August 14, 1929.]

[Amendment (Sec. 10) approved June 5, 1933. In effect August 21, 1933.]

The people of the State of California do enact as follows:

SECTION 1. There is hereby created and established a state mining bureau. The chief officer of such bureau shall be the state mineralogist, which office is hereby created.

SEC. 2. It shall be the duty of the governor of the State of California and he is hereby empowered to appoint a citizen and resident of this state, having a practical and scientific knowledge of mining, to the office of state mineralogist. Said state mineralogist shall hold his office at the pleasure of the governor. He shall be a civil executive officer. He shall take and subscribe the same oath of office as other state officers. He shall receive for his services a salary of three hundred dollars (\$300) per month, to be paid at the same time and in the same manner as the salaries of other state officers. He shall also receive his necessary traveling expenses when traveling on the business of his office. He shall give bond for the faithful performance of his duties in the sum of ten thousand dollars (\$10,000), said bond to be approved by the governor of the state of California.

SEC. 3. Said state mineralogist shall employ competent geologists, field assistants, qualified specialists and office employees when necessary in the execution of his plans and operations of the bureau, and fix their compensation. The said employees shall be allowed their necessary traveling expenses when traveling on the business of said department and shall hold office at the pleasure of said state mineralogist.

SEC. 4. It shall be the duty of said state mineralogist to make, facilitate, and encourage, special studies of the mineral resources and mineral industries of the state. It shall be his duty: to collect statistics concerning the occurrence and production of the economically important minerals and the methods pursued in making their valuable constituents available for commercial use; to make a collection of typical geological and mineralogical specimens, especially those of economic and commercial importance, such collection constituting the museum of the state mining bureau; to provide a library of books, reports, drawings, bearing upon the mineral industries, and sciences of mineralogy and geology, and arts of mining and metallurgy, such library constituting the library of the state mining bureau; to make a collection of models, drawings and descriptions of the mechanical appliances used in mining and metallurgical processes; to preserve and so maintain such collections and library as to make them available for reference and examination, and open to

public inspection at reasonable hours; to maintain, in effect, a bureau of information concerning the mineral industries of this state, to consist of such collections and library, and to arrange, classify, catalogue, and index the data therein contained, in a manner to make the information available to those desiring it; to issue from time to time such bulletins as he may deem advisable concerning the statistics and technology of the mineral industries of this state.

SEC. 5. It is hereby made the duty of the owner, lessor, lessee, agent, manager or other person in charge of each and every mine, of whatever kind or character, within the state, to forward to the state mineralogist, upon his request, at his office not later than the thirty-first day of March, in each year, a detailed report upon forms which will be furnished showing the character of the mine, the number of men then employed, the method of working such mine and the general condition thereof, the total mineral production for the past year, and such owner, lessor, lessee, agent, manager or other person in charge of any mine within the state must furnish whatever information relative to such mine as the state mineralogist may from time to time require for the proper discharge of his official duties. Any owner, lessor, lessee, agent, manager or other person in charge of each and every mine of whatever kind or character within the state, who fails to comply with the above provisions shall be deemed guilty of a misdemeanor.*

SEC. 6. The state mineralogist now performing the duties of the office of state mineralogist shall perform the duties of the office of state mineralogist as in this act provided until the appointment and qualification of his successor as in this act provided.

SEC. 7. The said state mineralogist shall take possession, charge and control of the offices now occupied and used by the board of trustees and state mineralogist and the museum, library and laboratory of the mining bureau located in San Francisco as provided for by a certain act of the legislature approved March 23, 1893, and hereafter referred to in section fourteen hereof, and shall maintain such offices, museum, library and laboratory for the purposes provided in this act.

SEC. 8. Said state mineralogist or qualified assistant shall have full power and authority at any time to enter or examine any and all mines, quarries, wells, mills, reduction works, refining works and other mineral properties or working plants in this state in order to gather data to comply with the provisions of this act.

SEC. 9. The state mineralogist shall make a biennial report to the governor on or before the fifteenth day of September next preceding the regular session of the legislature.

SEC. 10. All moneys received by the State Mining Bureau (or State Division of Mines) or any officer thereof, from sales of publications issued by said bureau, shall be deposited at least once each month in the State treasury to the credit of a fund which is hereby created and designated "Division of mines revolving printing fund." Said fund shall be used and is hereby appropriated for the use of said bureau in addition to such other funds as may be from time to time appropriated by the Legislature, for the printing and publishing of reports, bulletins, and maps issued by the said bureau. The State Controller is authorized to require financial reports from the State Mining Bureau or any officer thereof.

SEC. 11. The said state mineralogist is hereby authorized and empowered to receive on behalf of this state, for the use and benefit of the state mining bureau, gifts, bequests, devises and legacies of real or other property and to use the same in accordance with the wishes of the donors, and if no instructions are given by said donors, to manage, use, and dispose of the gifts and bequests and legacies for the best interests of said state mining bureau and in such manner as he may deem proper.

SEC. 12. The state mineralogist may, whenever he deems it advisable, prepare a special collection of ores and minerals of California to be sent to or used at any world's fair or exposition in order to display the mineral wealth of the state.

SEC. 13. The state mineralogist is hereby empowered to fix a price upon and to dispose of to the public, at such price, any and all publications of the state mining bureau, including reports, bulletins, maps, registers or other publications, such price shall approximate the cost of publication and distribution. Any and all sums derived from such disposition, or from gifts or bequests made, as hereinbefore provided must be accounted for by said state mineralogist and turned over to the state treasurer to be credited to the mining bureau fund as provided for in section

* Sec. 19 of the Penal Code of California provides: "Except in cases where a different punishment is prescribed by this code, every offense declared to be a misdemeanor is punishable by imprisonment in a county jail not exceeding six months, or by a fine not exceeding five hundred dollars, or by both."

ten. He is also empowered to furnish without cost to public libraries the publications of the bureau and to exchange publications with other geological surveys and scientific societies, etc.

SEC. 14. The state mineralogist provided for by this act shall be the successor in interest of the board of trustees of the state mining bureau, and the state mineralogist, under and by virtue of that certain act, entitled "An act to provide for the establishment, maintenance, and support of a bureau, to be known as the state mining bureau, and for the appointment and duties of a board of trustees, to be known as the board of trustees of the state mining bureau, who shall have the direction, management, and control of said state mining bureau, and to provide for the appointment, duties, and compensation of a state mineralogist, who shall perform the duties of his office under the control, direction and supervision of the board of trustees of the state mining bureau," approved March 23, 1893, and all books, papers, documents, personal property, records, and property of every kind and description obtained or possessed, or held or controlled by the said board of trustees of the said state mining bureau, and the state mineralogist, and the clerks and employees thereof, under the provisions of said act of March 23, 1893, or any act supplemental thereto or amendatory thereof, shall immediately be turned over and delivered to the said state mineralogist herein provided for, who shall have charge and control thereof.

SEC. 15. That certain act entitled "An act to provide for the establishment, maintenance, and support of a bureau, to be known as the state mining bureau, and for the appointment and duties of a board of trustees, to be known as the board of trustees of the state mining bureau, and to provide for the appointment, duties and compensation of a state mineralogist, who shall perform the duties of his office under the control, direction, and supervision of the board of trustees of the state mining bureau," approved March 23, 1893, together with all acts amendatory thereof and supplemental thereto and all acts in conflict herewith are hereby repealed.

SEC. 16. For the purpose of this act and as used herein the term "mine" is hereby defined to embrace and include all mineral bearing properties of whatever kind or character whether underground, quarry, pit, well, spring or other source from which any mineral substance is or may be obtained, and the term "mineral" for the purposes of this act and whenever so used shall embrace and include any and all mineral products both metallic and nonmetallic, solid, liquid or gaseous, and mineral waters of whatever kind or character.

DEPARTMENT OF NATURAL RESOURCES ACT

Chap. 128 [Stats. 1927]; amended, Chap. 307 [Stats. 1929.]

An act to add a new article to chapter three of title one of part three of the Political Code to be numbered article two j, embracing sections three hundred seventy-three to three hundred seventy-three i, relating to a department of natural resources.

[Approved by the Governor April 13, 1927.]

[Amendment approved May 18, 1929.]

The people of the State of California do enact as follows:

SECTION 1. The Political Code is hereby amended by adding a new article to chapter III of title I of part III thereof, to be numbered article IIj, embracing sections 373 to 373i and to read as follows:

ARTICLE IIj.

DEPARTMENT OF NATURAL RESOURCES.

373. A department of the government of the State of California to be known as the department of natural resources is hereby created. The department shall be conducted under the control of an executive officer to be known as the director of natural resources, which office is hereby created. The director shall be appointed by and hold office at the pleasure of the governor and shall receive a salary of six thousand dollars per annum.

Except as in this article otherwise provided, the provisions of article II of this chapter, title, and part of the Political Code as adopted at the forty-fourth session of the Legislature and as the same may be amended from time to time, shall govern and apply to the conduct of the department of natural resources in every respect the same as if such provisions were herein set forth at length and wherever in said article II the term "head of the department" or similar designation occurs, the same shall for the purposes of this article mean the director of natural resources.

373a. For purposes of administration the department shall be forthwith organized by the director thereof, subject to the approval of the governor, in such manner as he shall deem necessary to properly segregate and conduct the work of the department, and the director shall have power to appoint, in accordance with the civil service and other provisions of law, such deputies, officers and other expert and clerical assistants as may be necessary. The work of the department is hereby divided into at least four divisions to be known as the division of forestry, the division of parks, the division of fish and game, and the division of mines.

373b. The division of mines shall be administered through a chief who shall be appointed by the director of natural resources upon the nomination of the state mining board, the chief to be a technically trained mining engineer and to be known as the state mineralogist; such chief shall receive a salary of six thousand dollars per annum. General policies for the guidance of the division of mines shall be determined by a board to be known as the state mining board, which shall consist of five members appointed by and to hold office at the pleasure of the governor.

373c. The division of forestry shall be administered through a chief of division who shall be known as the state forester, who shall be a technically trained forester, appointed by the director of natural resources upon nomination by the state board of forestry hereinafter provided. General policies for the guidance of the division of forestry shall be determined by a state board of forestry which shall consist of seven members appointed by and holding office at the pleasure of the governor. Of the seven members one shall be familiar with the pine timber industry, one with the redwood industry, one with the live stock industry, one with general agriculture and one with the problems of water conservation.

373d. The division of parks shall be administered through a chief of division who shall be appointed by the director of natural resources upon nomination by the state park commission hereinafter provided. General policies for the administration of the state park system shall be determined by the state park commission

which is hereby created to consist of five members appointed by the governor and holding office at his pleasure.

373e. The division of fish and game shall be administered through a fish and game commission consisting of three members appointed by and holding office at the pleasure of the governor.

373f. The chiefs of the divisions of forestry and parks respectively shall receive such salaries as may be determined by the director with the approval of the governor. The director of natural resources and the chief of each division before entering upon his duties shall execute to the State of California an official bond in the penal sum of twenty-five thousand dollars conditioned upon the faithful performance of his duties. The members of the board of forestry, the state parks commission and fish and game commission shall serve without compensation, but shall be entitled to their actual expenses incurred in the performance of their duties.

373g. The department of natural resources shall succeed to and is hereby invested with all the duties, powers, purposes, responsibilities and jurisdiction of the state mining bureau, state mineralogist, department of petroleum and gas, state oil and gas supervisor, state forester, state board of forestry, California redwood park commission, San Pasqual battlefield commission, Mount Diablo park commission, state fish and game commission, state fish and game commissioners, and, except as herein otherwise provided, of the several officers, deputies and employees of such bodies and offices, and whenever by the provisions of any statute or law now in force or that may hereafter be enacted a duty or jurisdiction is imposed or authority conferred upon any of said officers, offices, bodies, deputies or employees by any statute the enforcement of which is transferred to the department, such duty, jurisdiction and authority are hereby imposed upon and transferred to the department of natural resources and the appropriate officers thereof with the same force and effect as though the title of said department of natural resources had been specifically set forth and named therein in lieu of the name of any such body, office, officer, deputy or employee. Said bodies and offices, the duties, powers, purposes, responsibilities and jurisdiction of which are so transferred and vested in the department of natural resources, and the positions of all officers, deputies and employees thereunder, are and each of them is hereby abolished and shall have no further legal existence, but the statutes and laws under which they existed and all laws prescribing their duties, powers, purposes, responsibilities and jurisdiction, together with all lawful rules and regulations established thereunder are hereby expressly continued in force.

The department of natural resources shall be in possession and control of all records, books, papers, offices, equipment, supplies, moneys, funds, appropriations, land and other property real or personal now or hereafter held for the benefit or use of said bodies, offices and officers.

The boards of district oil and gas commissioners, the offices of district oil and gas commissioners and the board of review, correction and equalization created by the act approved June 10, 1915, establishing the department of petroleum and gas, are hereby respectively continued in force with the powers, duties, responsibilities and jurisdiction in them vested by the provisions of said act approved June 10, 1915, as amended; *provided*, that said board of review shall consist of the director of natural resources, the director of finance and the chairman of the state board of equalization.

373h. The management and control of the property acquired by the State of California under or pursuant to the provisions of the act entitled "An act to accept the gift to the state of San Pasqual battlefield in San Diego county, to provide for collecting and systematizing the history of said battle, for determining the exact location thereof, and to report a suitable method of marking said battlefield and commemorating the heroism of those Americans who fought and died there," approved May 11, 1919, is hereby transferred to and vested in the department of natural resources.

373i. From and after the date upon which this act takes effect, the department of natural resources shall be and is hereby authorized and empowered to expend the moneys in any appropriation or in any special fund in the state treasury now remaining or made available by law for the administration of the provisions of all the statutes the administration of which is committed to the department, or for the use, support, or maintenance of any board, bureau, commission, department, office or officer whose duties, powers, and functions are, by the provisions of this article, transferred to and conferred upon the department of natural resources. Such expenditures by the department shall be made in accordance with law in carrying out the purposes for which such appropriations were made or such special funds created.

PUBLICATIONS OF THE DIVISION OF MINES

During the past fifty-one years, in carrying out the provisions of the organic act creating the former California State Mining Bureau, there have been published many reports, bulletins and maps which go to make up a library of detailed information on the mineral industry of the State, a large part of which could not be duplicated from any other source.

One feature that has added to the popularity of the publications is that many of them have been distributed without cost to the public, and even the more elaborate ones have been sold at a price which barely covers the cost of printing.

Owing to the fact that funds for the advancing of the work of this department have often been limited, many of the reports and bulletins mentioned were printed in limited editions which are now entirely exhausted.

Copies of such publications are available, however, in the offices of the Division of Mines, in the Ferry Building, San Francisco; Bankers Building, Los Angeles; State Office Building, Sacramento; Redding; and Division of Oil and Gas, Santa Barbara; Santa Paula; Coalinga; Taft, Bakersfield. They may also be found in many public, private and technical libraries in California and other States and foreign countries.

A catalog of all publications from 1880 to 1917, giving a synopsis of their contents, is issued as Bulletin No. 77.

Publications in stock may be obtained by addressing any of the above offices and enclosing the requisite amount in the case of publications that have a list price. Only coin, stamps or money orders should be sent, and it will be appreciated if remittance is made in this manner rather than by personal check.

Money orders should be made payable to the Division of Mines.

NOTE.—The Division of Mines frequently receives requests for some of the early Reports and Bulletins now out of print, and it will be appreciated if parties having such publications and wishing to dispose of them will advise this office.

REPORTS

Asterisks (**) indicate the publication is out of print.

	Price	Shipping Charges
**First Annual Report of the State Mineralogist, 1880, 43 pp. Henry G. Hanks-----	-----	-----
**Second Annual Report of the State Mineralogist, 1882, 514 pp., 4 illustrations, 1 map. Henry G. Hanks-----	-----	-----
**Third Annual Report of the State Mineralogist, 1883, 111 pp., 21 illustrations. Henry G. Hanks-----	-----	-----
**Fourth Annual Report of the State Mineralogist, 1884, 410 pp., 7 illustrations. Henry G. Hanks-----	-----	-----
**Fifth Annual Report of the State Mineralogist, 1885, 234 pp., 15 illustrations, 1 geological map. Henry G. Hanks-----	-----	-----
**Sixth Annual Report of the State Mineralogist, Part I, 1886, 145 pp., 3 illustrations, 1 map. Henry G. Hanks-----	-----	-----
**Part II, 1887, 222 pp., 36 illustrations. William Irelan, Jr.---	-----	-----
**Seventh Annual Report of the State Mineralogist, 1887, 315 pp. William Irelan, Jr.-----	-----	-----
**Eighth Annual Report of the State Mineralogist, 1888, 948 pp., 122 illustrations. William Irelan, Jr.-----	-----	-----
**Ninth Annual Report of the State Mineralogist, 1889, 352 pp., 57 illustrations, 2 maps. William Irelan, Jr.-----	-----	-----
**Tenth Annual Report of the State Mineralogist, 1890, 983 pp., 179 illustrations, 10 maps. William Irelan, Jr.-----	-----	-----
Eleventh Report (First Biennial) of the State Mineralogist, for the two years ending September 15, 1892, 612 pp., 73 illus- trations, 4 maps. William Irelan, Jr.-----	\$1.00	\$0.20
**Twelfth Report (Second Biennial) of the State Mineralogist, for the two years ending September 15, 1894, 541 pp., 101 illustrations, 5 maps. J. J. Crawford-----	-----	-----
**Thirteenth Report (Third Biennial) of the State Mineralogist, for the two years ending September 15, 1896, 726 pp., 93 illustrations, 1 map. J. J. Crawford-----	-----	-----
Chapters of the State Mineralogist's Report, Biennial Period, 1913-1914, Fletcher Hamilton:		
**Mines and Mineral Resources, Amador, Calaveras and Tuolumne Counties, 172 pp., paper-----	-----	-----
Mines and Mineral Resources, Colusa, Glenn, Lake, Marin, Napa, Solano, Sonoma and Yolo Counties, 208 pp., paper-----	.50	.10
**Mines and Mineral Resources, Del Norte, Humboldt and Mendo- cino Counties, 59 pp., paper-----	-----	-----
**Mines and Mineral Resources, Fresno, Kern, Kings, Madera, Mariposa, Merced, San Joaquin and Stanislaus Counties, 220 pp., paper-----	-----	-----
**Mines and Mineral Resources of Imperial and San Diego Coun- ties, 113 pp., paper-----	-----	-----
**Mines and Mineral Resources, Shasta, Siskiyou and Trinity Counties, 180 pp., paper-----	-----	-----
**Fourteenth Report of the State Mineralogist, for the Biennial Period 1913-1914, Fletcher Hamilton, 1915: A General Report on the Mines and Mineral Resources of Amador, Calaveras, Tuolumne, Colusa, Glenn, Lake, Marin, Napa, Solano, Sonoma, Yolo, Del Norte, Humboldt, Mendo- cino, Fresno, Kern, Kings, Madera, Mariposa, Merced, San Joaquin, Stanislaus, San Diego, Imperial, Shasta, Siskiyou and Trinity Counties, 974 pp., 275 illustrations, cloth-----	-----	-----
Chapters of the State Mineralogist's Report, Biennial Period, 1915-1916, Fletcher Hamilton:		
**Mines and Mineral Resources, Alpine, Inyo and Mono Counties, 176 pp., paper-----	-----	-----
Mines and Mineral Resources, Butte, Lassen, Modoc, Sutter and Tehama Counties, 91 pp., paper-----	.50	.05
**Mines and Mineral Resources, El Dorado, Placer, Sacramento and Yuba Counties, 198 pp., paper-----	-----	-----
**Mines and Mineral Resources, Monterey, San Benito, San Luis Obispo, Santa Barbara and Ventura Counties, 183 pp., paper-----	-----	-----
**Mines and Mineral Resources, Los Angeles, Orange and River- side Counties, 136 pp., paper-----	-----	-----
**Mines and Mineral Resources, San Bernardino and Tulare Counties, 186 pp., paper-----	-----	-----

REPORTS—Continued

Asterisks (**) indicate the publication is out of print.

	Price	Shipping Charges
**Fifteenth Report of the State Mineralogist, for the Biennial Period 1915-1916, Fletcher Hamilton, 1917: A General Report on the Mines and Mineral Resources of Alpine, Inyo, Mono, Butte, Lassen, Modoc, Sutter, Tehama, Placer, Sacramento, Yuba, Los Angeles, Orange, Riverside, San Benito, San Luis Obispo, Santa Barbara, Ventura, San Bernardino and Tulare Counties, 990 pp., 413 illustrations, cloth -----		
Chapters of the State Mineralogist's Report, Biennial Period, 1917-1918, Fletcher Hamilton:		
Mines and Mineral Resources of Nevada County, 270 pp., paper-----	\$0.75	\$0.15
Mines and Mineral Resources of Plumas County, 188 pp., paper-----	.50	.10
Mines and Mineral Resources of Sierra County, 144 pp., paper-----	.50	.10
Seventeenth Report of the State Mineralogist, 1920, 'Mining in California during 1920,' Fletcher Hamilton; 562 pp., 71 illustrations, cloth -----	1.75	.25
Eighteenth Report of the State Mineralogist, 1922, 'Mining in California,' Fletcher Hamilton. Chapters published monthly beginning with January, 1922:		
**January, **February, **March, **April, **May, **June, July, August, September, October, **November, December, 1922-----	.25	.05
Chapters of Nineteenth Report of the State Mineralogist, 'Mining in California,' Fletcher Hamilton and Lloyd L. Root. January, February, March, September, 1923-----	.25	.05
Chapters of Twentieth Report of the State Mineralogist, 'Mining in California,' Lloyd L. Root. Published quarterly. January, April, **July, October, 1924, per copy-----	.25	.05
Chapters of Twenty-first Report of the State Mineralogist, 'Mining in California,' Lloyd L. Root. Published quarterly:		
January, 1925, Mines and Mineral Resources of Sacramento, Monterey and Orange Counties -----	.25	.05
April, 1925, Mines and Mineral Resources of Calaveras, Merced, San Joaquin, Stanislaus and Ventura Counties-----	.25	.05
July, 1925, Mines and Mineral Resources of Del Norte, Humboldt and San Diego Counties-----	.25	.10
**October, 1925, Mines and Mineral Resources of Siskiyou, San Luis Obispo and Santa Barbara Counties-----		
Chapters of Twenty-second Report of the State Mineralogist, 'Mining in California,' Lloyd L. Root. Published quarterly:		
**January, 1926, Mines and Mineral Resources of Trinity and Santa Cruz Counties-----		
April, 1926, Mines and Mineral Resources of Shasta, San Benito and Imperial Counties-----	.25	.10
July, 1926, Mines and Mineral Resources of Marin and Sonoma Counties -----	.25	.05
**October, 1926, Mines and Mineral Resources of El Dorado and Inyo Counties, also report on Minaret District, Madera County -----		
Chapters of Twenty-third Report of the State Mineralogist, 'Mining in California,' Lloyd L. Root. Published quarterly:		
January, 1927, Mines and Mineral Resources of Contra Costa County; Santa Catalina Island-----	.25	.10
April, 1927, Mines and Mineral Resources of Amador and Solano Counties -----	.25	.05
July, 1927, Mines and Mineral Resources of Placer and Los Angeles Counties -----	.25	.10
October, 1927, Mines and Mineral Resources of Mono County-----	.25	.05
Chapters of Twenty-fourth Report of the State Mineralogist, 'Mining in California,' Lloyd L. Root. Published quarterly:		
January, 1928, Mines and Mineral Resources of Tuolumne County -----	.25	.05
April, 1928, Mines and Mineral Resources of Mariposa County-----	.25	.05
July, 1928, Mines and Mineral Resources of Butte and Tehama Counties -----	.25	.05
October, 1928, Mines and Mineral Resources of Plumas and Madera Counties -----	.25	.05
Chapters of Twenty-fifth Report of the State Mineralogist, 'Mining in California,' Walter W. Bradley. Published quarterly:		
**January, 1929, Mines and Mineral Resources of Lassen, Modoc and Kern Counties; also on Special Placer Machines-----		

REPORTS—Continued

Asterisks (**) indicate the publication is out of print.

	Price	Shipping Charges
April, 1929, Mines and Mineral Resources of Sierra, Napa, San Francisco and San Mateo Counties-----	\$0.25	\$0.10
July, 1929, Mines and Mineral Resources of Colusa, Fresno and Lake Counties -----	.25	.10
October, 1929, Mines and Mineral Resources of Glenn, Alameda, Mendocino and Riverside Counties-----	.25	.10
Chapters of Twenty-sixth Report of the State Mineralogist, 'Mining in California,' Walter W. Bradley. Published quarterly:		
January, 1930, Mines and Mineral Resources of Santa Clara County; also Barite in California-----	.25	.05
April, 1930, Mines and Mineral Resources of Nevada County; also Mineral Paint Materials in California-----	.25	.05
July, 1930, Mines and Mineral Resources of Yuba and San Bernardino Counties; also Commercial Grinding Plants in California -----	.25	.10
October, 1930, Mines and Mineral Resources of Butte, Kings and Tulare Counties; also Geology of Southwestern Mono County (Preliminary)-----	.25	.10
Chapters of Twenty-seventh Report of the State Mineralogist, 'Mining in California,' Walter W. Bradley. Published quarterly:		
January, 1931, Preliminary Report on Economic Geology of the Shasta Quadrangle. Beryllium and Beryl. The New Tariff and Nonmetallic Products. Crystalline Tale. Decorative Effects in Concrete-----	.25	.10
April, 1931, Stratigraphy of the Kreyenhagen Shale. Diatoms and Silicoflagellates of the Kreyenhagen Shale. Foraminifera of the Kreyenhagen Shale. Geology of Santa Cruz Island -----	.25	.10
July, 1931. (Yuba, San Bernardino.) Feldspar, Silica, Andalusite and Cyanite Deposits of California. Note on a Deposit of Andalusite in Mono County; its occurrence and chemical importance. Bill creating Trinity and Klamath River Fish and Game District and its effect upon mining-----	.25	.10
October, 1931. (Alpine.) Geology of the San Jacinto Quadrangle south of San Geronimo Pass, California. Notes on Mining Activities in Inyo and Mono Counties in July, 1931-----	.25	.05
Chapters of Twenty-eighth Report of the State Mineralogist, 'Mining in California,' Walter W. Bradley. Published quarterly:		
January, 1932, Economic Mineral Deposits of the San Jacinto Quadrangle. Geology and Physical Properties of Building Stone from Carmel Valley. Contributions to the Study of Sediments. Sediments of Monterey Bay. Sanbornite-----	.25	.10
**April, 1932. Elementary Placer Mining Methods and Gold Saving Devices. The Pan, Rocker and Sluice Box. Prospecting for Vein Deposits. Bibliography of Placer Mining-----	----	----
Abstract from April quarterly: Elementary Placer Mining Methods and Gold Saving Devices. Types of Deposits. Simple Equipment. Special Machines. Dry Washing. Black Sand Treatment. Marketing of Products. Placer Mining Areas. Laws. Prospecting for Quartz Veins. Bibliography (mimeographed)-----	.20	.05
July-October. (Ventura.) Report accompanying Geologic Map of Northern Sierra Nevada. Fossil Plants in Auriferous Gravels of the Sierra Nevada. Glacial and Associated Stream Deposits of the Sierra Nevada. Jurassic and Cretaceous Divisions in the Knoxville-Shasta Succession of California. Geology of a Part of the Panamint Range. Economic Report of a Part of the Panamint Range. Acquiring Mining Claims Through Tax Title. The Biennial Report of State Mineralogist-----	.50	.15
Chapters of Report XXIX, 1933 (quarterly): titled "California Journal of Mines and Geology," containing the following:		
January-April. Gold Deposits of the Redding and Weaverville Quadrangles. Geologic Formations of the Redding-Weaverville District, Northern California. Geology of Portions of Del Norte and Siskiyou Counties. Applications of Geology to Civil Engineering. The Lakes of California. Limestone Deposits of San Francisco Region. Limestone		

REPORTS—Continued

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Residual Soils of San Francisco Region. Discovery of Piedmontite in the Sierra Nevada. Tracing 'Buried River' Channel Deposits by Geomagnetic Methods. Geologic Map of Redding-Weaverville District, showing gold mines and prospects. Geologic Map showing various mines and prospects of part of Del Norte and Siskiyou Counties. Geologic Map of the San Francisco Region-----	\$0.80	\$0.15
Subscription, \$1.50 in advance (by calendar year, only).		
Chapters of State Oil and Gas Supervisor's Report:		
Summary of Operations—California Oil Fields, July, 1918, to March, 1919 (one volume)-----	Free	----
Summary of Operations—California Oil Fields. Published monthly, beginning April, 1919:		
**April, **May, **June, **July, **August, **September, **October, **November, **December, 1919-----	----	----
**January, **February, **March, **April, **May, **June, **July, **August, **September, **October, **November, **December, 1920-----	----	----
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BULLETINS

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**Bulletin No. 3. Gas and Petroleum Yielding Formations of Central Valley of California, by W. L. Watts. 1894, 100 pp., 13 illustrations, 4 maps	----	----
**Bulletin No. 4. Catalogue of Californian Fossils, by J. G. Cooper. 1894, 73 pp., 67 illustrations. (Part I was published in the Seventh Annual Report of the State Mineralogist, 1887)	----	----
**Bulletin No. 5. The Cyanide Process, 1894, by Dr. A. Scheidel. 140 pp., 46 illustrations	----	----
**Bulletin No. 6. California Gold Mill Practices, 1895, by E. B. Preston, 85 pp., 46 illustrations	----	----
**Bulletin No. 7. Mineral Production of California, by Counties, for the year 1894, by Charles G. Yale. Tabulated sheet	----	----
**Bulletin No. 8. Mineral Production of California, by Counties, for the year 1895, by Charles G. Yale. Tabulated sheet	----	----
**Bulletin No. 9. Mine Drainage, Pumps, etc., by Hans C. Behr. 1896, 210 pp., 206 illustrations	----	----
**Bulletin No. 10. A bibliography Relating to the Geology, Paleontology and Mineral Resources of California, by Anthony W. Vogdes. 1896, 121 pp.	----	----
**Bulletin No. 11. Oil and Gas Yielding Formations of Los Angeles, Ventura and Santa Barbara Counties, by W. L. Watts. 1897, 94 pp., 6 maps, 31 illustrations	----	----
**Bulletin No. 12. Mineral Production of California, by Counties, for 1896, by Charles G. Yale. Tabulated sheet	----	----
**Bulletin No. 13. Mineral Production of California, by Counties, for 1897, by Charles G. Yale. Tabulated sheet	----	----
**Bulletin No. 14. Mineral Production of California, by Counties, for 1898, by Charles G. Yale	----	----
**Bulletin No. 15. Map of Oil City Fields, Fresno County, by John H. Means, 1899	----	----
**Bulletin No. 16. The Genesis of Petroleum and Asphaltum in California, by A. S. Cooper. 1899, 39 pp., 29 illustrations	----	----
**Bulletin No. 17. Mineral Production of California, by Counties, for 1899, by Charles G. Yale. Tabulated sheet	----	----
**Bulletin No. 18. Mother Lode Region of California, by W. H. Storms. 1900, 154 pp., 49 illustrations	----	----
**Bulletin No. 19. Oil and Gas Yielding Formations of California, by W. L. Watts. 1900, 236 pp., 60 illustrations, 8 maps	----	----
**Bulletin No. 20. Synopsis of General Report of State Mining Bureau, by W. L. Watts. 1901, 21 pp. This bulletin contains a brief statement of the progress of the mineral industry in California for the four years ending December, 1899	----	----
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Bulletin No. 23. The Copper Resources of California, by P. C. DuBois, F. M. Anderson, J. H. Tibbits and G. A. Tweedy. 1902, 282 pp., 69 illustrations, 9 maps	\$0.50	\$0.20
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**Reconnaissance Geologic Map (of which Bulletin 72 is explanatory), in 23 colors. Scale: 1 inch=12 miles. Mounted--	----	----
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**Preliminary Report No. 2. Notes on Damage by Water in California Oil Fields, March, 1914. By R. P. McLaughlin, 4 pp. -----	-----	-----
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**Preliminary Report No. 6. A Review of Mining in California During 1919. By Fletcher Hamilton, 1920. 43 pp. Paper -----	-----	-----
**Preliminary Report No. 7. The Clay Industry in California. By E. S. Boalich, W. O. Castello, E. Huguenin, C. A. Logan, and W. B. Tucker, 1920. 102 pp. 24 illustrations. Paper -----	-----	-----
**Preliminary Report No. 8. A Review of Mining in California During 1921, with Notes on the Outlook for 1922. By Fletcher Hamilton, 1922. 68 pp. Paper -----	-----	-----

MISCELLANEOUS PUBLICATIONS

**First Annual Catalogue of the State Museum of California, being the collection made by the State Mining Bureau during the year ending April 16, 1881. 350 pp.-----	-----	-----
**Catalogue of books, maps, lithographs, photographs, etc., in the library of the State Mining Bureau at San Francisco, May 15, 1884. 19 pp.-----	-----	-----
**Catalogue of the State Museum of California, Volume II, being the collection made by the State Mining Bureau from April 16, 1881, to May 5, 1884. 220 pp.-----	-----	-----
**Catalogue of the State Museum of California, Volume III, being the collection made by the State Mining Bureau from May 15, 1884, to March 31, 1887. 195 pp.-----	-----	-----
**Catalogue of the State Museum of California, Volume IV, being the collection made by the State Mining Bureau from March 30, 1887, to August 20, 1890. 261 pp.-----	-----	-----
**Catalogue of the Library of the California State Mining Bureau, September 1, 1892. 149 pp.-----	-----	-----
**Catalogue of West North American and Many Foreign Shells with Their Geographical Ranges, by J. G. Cooper. Printed for the State Mining Bureau, April, 1894.-----	-----	-----
**Report of the Board of Trustees for the four years ending September, 1900. 15 pp. Paper -----	-----	-----
Bulletin. Reconnaissance of the Colorado Desert Mining District. By Stephen Bowers, 1901. 19 pp. 2 illustrations. Paper -----	\$0.10	-----
Commercial Mineral Notes. A monthly mimeographed sheet, beginning April, 1923.-----	Free	-----

MAPS

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**Register of Mines, with Map, Nevada County-----	----	----
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**Register of Mines, with Map, Plumas County-----	----	----
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Register of Mines, with Map, Santa Barbara County (1906)---	.25	.05
**Register of Mines, with Map, Shasta County-----	----	----
**Register of Mines, with Map, Sierra County-----	----	----
**Register of Mines, with Map, Siskiyou County-----	----	----
**Register of Mines, with Map, Trinity County-----	----	----
**Register of Mines, with Map, Tuolumne County-----	----	----
Register of Mines, with Map, Yuba County (1905)-----	.25	.05
Register of Oil Wells, with Map, Los Angeles City (1906)-----	.35	.05

OTHER MAPS

**Map of California, Showing Mineral Deposits (50 x 60 in.)----	----	----
**Map of Forest Reserves in California-----	----	----
**Mineral and Relief Map of California-----	----	----
**Map of El Dorado County, Showing Boundaries, National Forests-----	----	----
**Map of Madera County, Showing Boundaries, National Forests-----	----	----
**Map of Placer County, Showing Boundaries, National Forests-----	----	----
**Map of Shasta County, Showing Boundaries, National Forests-----	----	----
**Map of Sierra County, Showing Boundaries, National Forests-----	----	----
**Map of Siskiyou County, Showing Boundaries, National Forests-----	----	----
**Map of Tuolumne County, Showing Boundaries, National Forests-----	----	----
**Map of Mother Lode Region-----	----	----
**Map of Desert Region of Southern California-----	----	----
Map of Minaret District, Madera County-----	.20	.05
Map of Copper Deposits in California-----	.05	----
**Map of Calaveras County-----	----	----
**Map of Plumas County-----	----	----
**Map of Trinity County-----	----	----
**Map of Tuolumne County-----	----	----
Geological Map of Inyo County. Scale 1 inch equals 4 miles----	.60	.05
**Map of California accompanying Bulletin No. 89, shewing generalized classification of land with regard to oil possibilities. Map only, without Bulletin-----	----	----
Geological Map of California, 1916. Scale 1 inch equals 12 miles. As accurate and up-to-date as available data will permit as regards topography and geography. Shows railroads, highways, post offices and other towns. First geological map that has been available since 1892, and shows geology of entire state as no other map does. Geological details lithographed in 23 colors. Unmounted-----	.75	.05
Mounted-----	2.00	.15
**Topographic Map of Sierra Nevada Gold Belt, showing distribution of auriferous gravels, accompanying Bulletin No. 92. In 4 colors (also sold singly)-----	----	----

OTHER MAPS—Continued

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	Price	Shipping Charges
Geologic Map of Northern Sierra Nevada, showing Tertiary River Channels and Mother Lode Belt, accompanying July-October Chapter of Report XXVIII of the State Mineralogist. (Sold singly)-----	\$0.25	\$0.05
Map of Northern California, showing rivers and creeks which produced placer gold in 1932-----	.20	.05

OIL FIELD MAPS

The maps are revised from time to time as development work advances and ownerships change.

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Map No. 20—Long Beach, Los Angeles County-----	1.50
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DETERMINATION OF MINERAL SAMPLES

Samples (limited to three at one time) of any mineral found in the State may be sent to the Division of Mines for identification, and the same will be classified free of charge. No samples will be determined if received from points outside the State. It must be understood that no assays, or quantitative determinations will be made. Samples should be in lump form if possible, and marked plainly with name of sender on outside of package, etc. No samples will be received unless delivery charges are prepaid. A letter should accompany sample, giving locality where mineral was found and the nature of the information desired.

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STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES
GEORGE D. NORDENHOLT, Director

DIVISION OF MINES
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WALTER W. BRADLEY

State Mineralogist

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